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ORIGINAL ARTICLE

Determinants of occupational burnout among employees of the Emergency Medical Services in Poland

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Abstract

Introduction. Occupational burnout is a multifaceted phenomenon and a problem often encountered among medical personnel. An example of such a group are workers of the Emergency Medical Services (EMS). The aim of the present study was to make an attempt to assess the level of job burnout among professionally active employees of the EMS and to compare the different occupational groups (paramedics, nurses of the system, doctors of the system) according to four analyzed factors.

Materials and methods. A cross-sectional study was performed using an on-line questionnaire. Four factors impacting the level of burnout were analyzed: 1) attitude to work; 2) workload; 3) contact with the patient; 4) attitude to stress). The minimum possible result on the scale is 36 points and the maximum – 252. Data were analysed by means of the Cronbach's alpha coefficient, the Spearman correlation, the Ramsey RESET test, the Chow test, VIF statistics.

Results. The average score for occupational burnout was 131.0 points (SD ± 31.47). The tool's reliability measured by means of Cronbach's alpha was 0.910). Both nurses and doctors obtained higher results throughout the scale ($\beta_{stand.}$ 0.147 and 0.215). Significant differences were shown between the group working only in the Helicopter Emergency Medical Service (HEMS) teams and the other services (land EMS, emergency rooms, etc.) at the level of $p < 0.000$.

Conclusions. EMS employees encounter varying degrees of threat by occupational burnout. Doctors working in the system are shown to have the highest level of burnout, while paramedics the lowest. Among all the jobs analyzed, the lowest level of occupational burnout has been demonstrated by employees of HEMS.

Key words

workload, State Medical Emergency Services, psychometric test, attitude to work, attitude to stress, occupational (job) burnout, contact with the patient

INTRODUCTION

Occupational burnout is a multi-faceted phenomenon which is relatively difficult to specify explicitly. There are many well-known suggestions about how to define this problem, which usually point-out encountering prolonged emotional and interpersonal stressors at work leading to the reactions of exhaustion and depersonalization. The most universal definition was coined by Christina Maslach, who stated:

> *Burnout is a syndrome of emotional exhaustion, depersonalization and reduced personal accomplishment that can occur among individuals who do "people work" of some kind".*

Work and climbing the career ladder are for many people an important aspect of life. Such an attitude usually leads to perceiving oneself as a valuable person when achieving spectacular success, being awarded bonuses and promotions. On the other hand, when there is a lack of significant achievement in every-day work, this leads to the accumulation of negative emotions connected with one's job [1]. Conflicts emerge, there is growing aggression towards co-workers and employers, as well as customers. The feelings of exhaustion, cynicism and of one's lack of capacity to perform become a three-dimensional foundation for developing the burnout syndrome [2].

The burnout phenomenon causes both absenteeism from work (frequently being late, being on sick leave), as well as health consequences. There is an increased risk of mental and behavioural problems, cardiovascular diseases, respiratory diseases, muscoskeletal disorders and digestive diseases [3, 4]. The multi-level destruction mechanism of job burnout influences the quality of an individual's life and that of the people in his or her closest social circle.

As early as the 1980s, scientific research showed that certain conditions cause burnout among medical personnel

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[5]. Those who are most at risk are front-line employees, i.e. workers directly dealing with patients, especially in life and health threatening situations. Such work environments as ambulance services, hospital emergency departments, and intensive therapy units have for years been researched to examine the level of post-traumatic stress disorders and occupational burnout among their employees.

While reviewing scientific articles, the authors noticed that recently a great variety of studies and research tools have been presented which are devoted to occupational burnout among employees of the Emergency Medical Services (EMS) [6, 7]. The presented study includes analysis of only three aspects of occupational burnout in the Emergency Medical Services (EMS) [8]. The questionnaires used are either standardized [9, 10] or developed by the authors [11, 12], which causes many problems when attempting to compare the results. Analysis of published studies led to the conclusion that the job burnout phenomenon among the Emergency Medical Services employees is both a huge and very complex problem.

OBJECTIVE

The aim of the present study was to make an attempt to assess the level of job burnout among professionally active employees of the EMS and to compare the different occupational groups (paramedics, nurses of the system, doctors of the system) according to the four factors being analyzed.

MATERIALS AND METHOD

The cross-sectional study was performed using an on-line questionnaire. The data were collected from July – September 2016 using the CAPI (computer-assisted personal interviewing). The questionnaire was distributed to members of the EMS three times by e-mail. 254 employees of the EMS participated and completed the questionnaire. Confidence level – 0.95; proportion – 0.5.

Inclusion criteria were: expressing voluntary consent to participate in the study; at least a one-year internship at EMS; having the right to practice as a nurse, paramedic or doctor. Exclusion criteria were: lack of consent to participate in the study; less than a year of work experience in EMS; no right to practice as a nurse, paramedic or doctor. The characteristics of the study group are summarized in Table 1.

Research tool. The study used the standardized to measure the level of occupational burnout among healthcare workers. The authors' form included seven questions defining the socio-demographic conditions of those surveyed (own elaboration) and 36 questions from the area of psychology [13]. The survey was anonymous, answers in the main part of the questionnaire were given on a 7-point Likert scale. The point rating scheme used by the authors made it possible to specify the exact level of burnout for each respondent, taking into account the four factors impacting the level of occupational burnout: 1) attitude to work; 2) workload; 3) contact with the patient; 4) attitude to stress. The minimum possible result on the scale is 36 points and the maximum 252.

Both the whole scale and individual subscales are characterized by high internal consistency measured by Cronbach's alpha coefficient (alpha = 0.907). In addition, each of the four subscales measures the selected factor of occupational burnout in a unidimensionality manner (self-value of the first item was greater than 1.00, and explained approximately 40% of the total variance).

Table 1. Socio-demographic characteristics of the study group

	Profession			
	Paramedics N = 197	Nurses N = 26	Physicians N = 25	P-value
Age (M, SD)	31.4 (6.64)	39.6 (9.02)	36.8 (10.06)	(H = 22.881) 0.000*
Work experience (M, SD)	8.0 (6.23)	17.2 (9.81)	10.6 (10.03)	(H = 19.838) 0.000*
Gender (N, %)				
Female	38 (19.3)	19 (73.1)	16 (64.0)	(χ^2 = 47.984)
Male	159 (80.7)	7 (26.9)	9 (36.0)	0.000**
Education level (N, %)				
Secondary	49 (24.9)	4 (15.4)	0 (0.0)	(χ^2 = 51.065)
Bachelor	92 (46.7)	8 (30.8)	0 (0.0)	0.000**
Master / Doctor	56 (28.4)	14 (53.8)	25 (100.0)	
Workplace (N, %)***				
Land EMS	61 (31.0)	3 (11.5)	2 (8.0)	
Land EMS + Other	37 (18.8)	2 (7.7)	2 (8.0)	
HEMS	8 (4.1)	4 (15.4)	3 (12.0)	
HEMS + Other	9 (4.6)	0 (0.0)	5 (20.0)	(χ^2 = 49.906)
ESD	0 (0.0)	1 (3.8)	0 (0.0)	0.000**
ESD + Other	8 (4.1)	0 (0.0)	0 (0.0)	
ER	15 (7.6)	6 (23.1)	2 (8.0)	
ER + Other	42 (21.3)	4 (15.4)	7 (28.0)	
Others	17 (8.6)	6 (23.1)	4 (16.0)	
Supervisor (N, %)				
Yes	125 (63.5)	9 (34.6)	6 (24.0)	(χ^2 = 19.679)
No	72 (36.5)	17 (65.4)	19 (76.0)	0.000**

Source: own work.
M – mean; SD – standard deviation
* Kruskal–Wallis one-way analysis of variance ** Chi-squared test
*** EMS – Emergency Medical Service
HEMS – Helicopter Emergency Medical Service
ESD – Emergency Service Dispatch
ER – Emergency Room

Statistical analysis. The internal consistency of the research tool measurements were estimated by specifying Cronenbach's alpha, assuming the threshold of good reliability as alpha 0.7. The discriminant validity of particular positions on the scale were estimated by specifying the differentiating power. The accuracy of the measurements within the four ranges specifying the particular aspect of the burnout phenomenon being researched was assessed by means of Spearman's rank correlation coefficient (r_s).

The analysis estimating the influence of potential variables of the job burnout level being observed used the multiple regression model estimating functions by means of the least squares method. The following characteristics were included in the group of independent variables being assessed: gender, age, years of job experience, occupation performed (paramedic, nurse doctor), performing managerial functions (head of emergency medical service team, medical coordinator, director, head of hospital ward, or department). In order to assess the impact of the above variables on the level of job burnout, five regression models were analyzed, for which the dependent variables were, respectively: attitude to work, workload, contact with the patient, attitude to stress, the total score for the occupational burnout scale in points. The parameters of the regression function and the assessment of standard errors were estimated and the standardized β

($\beta_{stand.}$) coefficient was specified in order to define the power of the influence of the predictors on the dependent variable. The regression models obtained in this way were tested from the point of view of the correctness of functional form and stability (Ramsey RESET test and Chow test), the presence of redundancy (VIF statistics) and the normal distribution of residuals (Jarque-Bera test).

In order to estimate the predictors that have an impact on the risk of occupational burnout, the model of logistic regression with Rosenbrock's and quasi- Newton's computation was used, with specifying asymptotic standard errors. In the logistic regression model, the same set of independent variables was used as in the multiple regression model described above. However, the dependent variable (explained) used to assess the risk of job burnout, was the fact of the respondent's obtaining a total result of at least 162 points on the scale (average result in the group surveyed + SD). The goodness of fit for the data to the logit function proposed was tested using the Hosmer-Lemeshow test. For each predictor the odds ratio (OR) was specified with a 95% confidence interval in order to specify the risk of occupational burnout occurring.

The calculations were performed using STATISTICA 13.3 software package with an extra 'PLUS tool" model (Dell, Inc.). The *a priori* significance level of $\alpha = 0.05$ was used for all the analyses.

RESULTS

Level of occupational burnout. The average score observed on the burnout scale was 131.0 points (SD ± 31.470), of which in 17.7% of the cases (N = 45) a low level risk was observed, and in 15.7% (N = 40) a high level of risk was demonstrated that the respondents can encounter occupational burnout (Fig. 1). The results of the measurements throughout the scale were reliable (alfa = 0.910), but in four of the 36 responses, a low value of the differentiating power was noted (<0.200). In addition, it was proved that the standardized score results on the standard scale of 10 for the four subscales, were well correlated with each other (r_s>0.400).

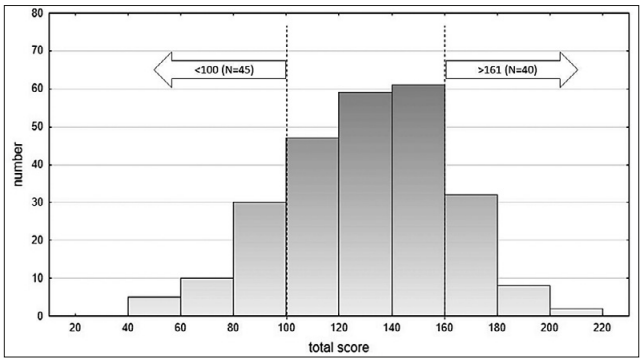

Figure 1. Number of respondents with particular scores reflecting the level of occupational burnout among employees of the EMS

Assessment of selected characteristics of potential influence on the level of occupational burnout. The models of multiple regression that were tested were stable and the redundancy analysis indicated that the premises of this statistical method were fulfilled (VIF > 10). Moreover, the regression functions suggested were correctly fitted to the variables of the model, and the residuals had a nearly normal distribution (Tab. 2).

Table 2. Parameters for assessing the multiple regression models (Source: own work)

Model (dependent variable)	Ramsey test*	Chow test	Jarque-Bera test
I – Attitude to work	F = 0.830 P = 0.437	F = 0.863 P = 0.537	JB = 0.554 P = 0.758
II – Workload	F = 0.122 P = 0.885	F = 1.127 P = 0.347	JB = 4.589 P = 0.101
III – Contact with the patient	F = 0.612 P = 0.543	F = 0.607 P = 0.750	JB = 3.017 P = 0.221
IV – Attitude to stress	F = 0.924 P = 0.398	F = 0.939 P = 0.477	JB = 0.125 P = 0.940
V – Total score	F = 0.209 P = 0.811	F = 1.084 P = 0.375	JB = 2.093 P = 0.351

* Regression Equation Specification Error Test (RESET)

Data collation from the analysis of multiple regression for all five models studied is presented in the Tables below. The variable that had the greatest influence on the scores attained by the respondent in the different sub-scales was the individual's profession. Both nurses and doctors obtained significantly higher scores than paramedics concerning attitude to work ($\beta_{stand.}$ 0.150 and 0.142, respectively) and workload ($\beta_{stand.}$ 0.146 and 0.181), as well as throughout the scale being assessed ($\beta_{stand.}$ 0.147 and 0.215). Moreover, in the case of doctors, a significantly higher score was obtained in the category of contact with the patient and attitude to stress ($\beta_{stand.}$ 0.219 and 0.256 respectively).

Assessment of socio-demographic variables showed that age was a significant factor connected with the respondents' score in the area of contact with the patient, and the total score for the whole scale. In both cases, the older the respondent the lower the score attained ($\beta_{stand.}$ -0.494 and -0.300, respectively). Moreover, it was observed that the more years the respondent worked, the higher the score in the field of contact with the patient ($\beta_{stand.}$ 0.387). None of the regression models analyzed showed a significant impact of gender on the risk of burnout, nor was it observed in any of the subscales concerning working in managerial positions

Table 3. Model of multiple regression for the dependent variable of contact with the patient (F = 3.500; P = 0.002) (Source: own work)

Independent variable	B	$\beta_{stand.}$	95% CI		t statistic	P-value
			lower	upper		
Intercept term	**42.472**				**11.514**	**<0.001**
Gender 0: Female 1: Male	-1.010	-0.059	-0.198	0.080	-0.839	0.402
Age	**-0.492**	**-0.494**	**-0.778**	**-0.210**	**-3.429**	**0.001**
Seniority	**0.394**	**0.387**	**0.100**	**0.674**	**2.656**	**0.008**
Profession* 0: Paramedic 1: Nurse	1.866	0.074	-0.071	0.219	1.001	0.318
Profession* 0: Paramedic 1: Physician	**5.655**	**0.219**	**0.082**	**0.356**	**3.159**	**0.002**
Management* 0: No 1: Yes	1.889	0.121	-0.013	0.254	1.780	0.076

* dichotomous variable
b – regression coefficient; β –standardized regression coefficient; t – value of statistics; 95% CI – 95% confidence interval

Table 4. Model of multiple regression for the dependent variable of attitude to stress (F = 3.914; P < 0.001) (Source: own work)

Independent variable	B	$\beta_{stand.}$	95% CI		t statistic	P-value
			lower	upper		
Intercept term	**19.128**				**8.628**	**<0.001**
Gender 0: Female 1: Male	-0.932	-0.091	-0.229	0.048	-1.287	0.199
Age	-0.110	-0.183	-0.465	0.100	-1.275	0.204
Seniority	0.048	0.077	-0.209	0.363	0.532	0.595
Profession* 0: Paramedic 1: Nurse	1.511	0.099	-0.046	0.243	1.348	0.179
Profession* 0: Paramedic 1: Physician	**3.991**	**0.256**	**0.120**	**0.392**	**3.708**	**0.000**
Management* 0: No 1: Yes	-0.022	-0.002	-0.135	0.131	-0.034	0.973

* dichotomous variable
b – regression coefficient; β –standardized regression coefficient; t – value of statistics; 95% CI – 95% confidence interval

Predictors of occupational burnout. The model of logistic regression suggested for assessing the risk of occupational burnout was statistically insignificant (Log [likelihood ratio] = -107.405; χ^2 = 247.412; P = 0.633), with the suggested logit function being correct (Hosmer-Lemeshow test: 4.532; P = 0.806). Estimating the function parameters showed that no socio-demographic factor influenced the likelihood of the respondent's obtaining a score >161 in a significant way. Similarly, there were no statistically significant dependencies among the predictors connected with the occupation performed, or with performing managerial functions.

108 people declared that they had only one job, whereas the other respondents (n=146) performed duty in at least two units. The analysis included both land EMS (n=108), as well as the Helicopter Emergency Medical Service (HEMS) units (n=30), Hospital Emergency Departments with emergency admission rooms (n=76) and other centres (n=29). The Kruskal-Wallis test showed statistically significant differences among the groups, i.e. at the level of p < 0.000. In *post-hoc* tests significant differences were revealed between the group working exclusively for HEMS units and other groups (land EMS, emergency rooms and others) (Tab. 5).

Table 5. Differences between groups viewed in the aspect of workplace (Source: own work)

Wokplace	p value for multiple comparisons						
	Land EMS **R: 120.38**	Land EMS + another job **R: 127.60**	HEMS **R: 45.67**	HEMS + another job **R: 95.37**	ER **R: 167.30**	ER + another job **R: 129.58**	OTHERS **R: 121.31**
Land EMS		1.000	**0.004**	1.000	0.121	1.000	1.000
Land EMS another job	1.000		**0.002**	1.000	0.632	1.000	1.000
HEMS	**0.004**	**0.002**		1.000	**0.000**	**0.001**	**0.015**
HEMS + another job	1.000	1.000	1.000		**0.043**	1.000	1.000
ER	0.121	0.633	**0.000**	**0.043**		0.663	0.401
ER + another job	1.000	1.000	**0.001**	1.000	0.663		1.000
OTHERS	1.000	1.000	**0.015**	1.000	0.401	1.000	

EMS – Emergency Medical Service
HEMS – Helicopter Emergency Medical Service
ER – Emergency Room

DISCUSSION

The problem of occupational burnout is a difficult phenomenon, both from the therapeutic and diagnostic point of view. The employee's self awareness can prove to be insufficient, therefore, researchers often use parametric tools in the form of psychological questionnaires. There are various forms worldwide to specify the level of occupational burnout and to diagnose the styles of coping with stress [14]. One of the most popular models is the Maslach Burnout Inventory (MBI), which has been in use since 1981. This is a highly standardized tool which consists of 24 questions on a 6-point scale assessing emotional exhaustion, depersonalization and sense of achievement [15]. Another example is the Coping Inventory for Stressful Situations (CISS), a questionnaire comprising 48 questions on a 5-point response format, where the results are presented in three scales [16]. According to the authors of the presented study, the tool they used, although not one of the most popular ones, is an optimal solution for the needs of the study, in that while using only 36 questions it allows assessment of as many as four aspects of occupational burnout.

Employees of EMS are highly exposed to the threat of occupational burnout due to the characteristics of their workplace environment, especially in pre-hospital conditions. The analysis performed showed an almost four-fold level of job burnout among the respondents, in comparison to the minimum level. The result is similar to that encountered by nurses working in Intensive Care Units (ICUs) [10, 13].

Taking into account all four aspects of occupational burnout that were analyzed, the highest score was obtained by doctors (on average, 153.46), then nurses (on average, 140), and the lowest by paramedics (on average, 117.88). In the context of attitude to work, contact with the patient and workload, statistically significant differences were demonstrated between nurses versus paramedics and doctors versus paramedics. In assessing the attitude to stress, there were significant differences only between doctors versus paramedics. The results obtained suggest that the occupational group most resistant to stress is that of paramedics. The explanation can be found in research on the professional qualifications of paramedics which show that this is a young occupational group characterized by a high level of responsibility, satisfaction, benefiting from modern lifelong learning, confidence in the tasks performed and motivation to act, although they do feel tired at work and have the impression that doctors and nurses do not have enough confidence in them [17,18, 19]. However, as other studies show, the profession of paramedic is highly at risk for depression or sleep disorders. [20]

In the group of EMS nurses, the level of burnout was significant. Interventions requiring quick decisions in life-threatening situations cause considerable stress. Research by other authors shows that nurses working in primary

care, not having contact with patients in a life-threatening condition, do not show signs of burnout [21]. In turn, another study shows that high medical care of a dying patient causes significant emotional exhaustion [22].

The socio-demographic factors included in the third hypothesis, such as age and seniority, i.e. years of work experience, did not have a significant impact on the level of the phenomenon being analyzed, but strongly correlated with it. It must be remembered that occupational burnout is caused by similar factors as Post-Trauma Stress Syndrome (PTSD) [23], that is the ability to view a situation objectively, as shown by older people, can influence their mental condition.

Performing managerial functions under the EMS, such as being manager of the EMS team, manager of an EMS station, head of a hospital unit or ward, did not have an impact on the level of occupational burnout. This hypothesis was therefore not confirmed. On the other hand, statistically significant differences were shown concerning the kind of workplace where the respondents were employed. People working for the Helicopter Emergency Medical Service (HEMS) showed a relatively lower level of occupational burnout than the others (EMS teams, Hospital Emergency Departments).

Since 2000, the Helicopter Emergency Medical Service has changed the priority of inter-hospital transport for medical emergency tasks [24]. In addition, the Helicopter Emergency Medical Service is a fast and safe way of transporting a patient independently at any time of the day and night [25], which can have an impact on the feeling of satisfaction and the low level of burnout among its employees. Therefore, the last hypothesis was confirmed.

The phenomenon being analyzed is a complex process, which does not appear suddenly but accumulates over time. [26] Doctors, nurses and paramedics should remember that all of them are playing an important role in the system and are indispensible in the therapeutic team. It is also important to be aware that interpersonal relations based on partnerships lead to higher job satisfaction. [27, 28, 29].

Limitations. It could be argued that the above research has particular limitations with respect to the brief period of the course and choice of the survey cohort, which was consisted entirely of employees from land EMS and HEMS majors. Due to the innovative research tool, there was no possibility of a broader comparison of results with previous works. In future, it would therefore be worthwhile including questions relating to the above in the survey It would therefore be worthwhile including them in future studies.

CONCLUSIONS

The psychological questionnaire used in this study is a helpful research tool for assessing the level of occupational burnout among EMS employees. Examining the problem from the point of view of the four factors that were analyzed, it was shown that the highest burnout rate occured among doctors of the system, and the lowest among the paramedics. In the light of the data, seniority, i.e. the accumulated years at work, age and gender, didnot have a significant impact on the level of occupational burnout. The study did not prove a dependency between job burnout and working in managerial positions. It is noteworthy that there were statistically significant differences between the particular workplaces, and employment in the Helicopter Emergency Medical Service proved to have the lowest level of occupational burnout.

In conclusion, the results obtained in the study are of great cognitive importance and can be used in the development of prevention and assistance programmes aimed at improving the quality of the personnel and the professional work of the employees of the EMS system.

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