Risk factors of burnout among physicians (results of public survey)

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ABSTRACT   *AIM: to identify risk factors for burnout of healthcare employees and to identify the most vulnerable category of practicing physicians.*

PATIENTS AND METHODS: an observational study based on a public survey started from June to August 2022. The validated Maslach Burnout Inventory questionnaire was used as a burnout assessment tool. An integral burnout index was calculated, on the basis of which significant risk factors were analyzed. The results obtained are presented in the form of a predictive nomogram.

RESULTS: the high degree of emotional burnout in Russia among doctors reaches 32%. The most significant professional risk factors are relationships between colleagues (p = 0.0002), overtime work (p = 0.006), work in outpatient unit (p = 0.006), with severe patients (p = 0.008) and uneven planning of work activities (0.0004). The protective factors are: family (p = 0.001), sports (p = 0.001), meditation (p = 0.005) and talking about own problems (p = 0.01).

CONCLUSION: burnout is a multifactorial problem. The proposed nomogram is useful for identification of the most vulnerable specialists.

KEYWORDS: burnout, depersonalization, decreases in personal accomplishment

CONFLICT OF INTEREST: the authors declare no conflict of interest

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INTRODUCTION

The term "burnout" was introduced in 1974 by psychoanalyst Freudenberger H.J. and implies a stress syndrome associated with exhaustion at work and resulting from chronic stress associated with excessive expenditure of energy, strength or resources [1]. In the Russian literature, the definition formulated by V.V. Boyko is accepted: "Emotional burnout is a psychological defense mechanism developed by a person in the form of complete or partial exclusion of emotions in response to selected traumatic effects and represents an acquired stereotype of emotional, most often professional, behavior" [2].

The modern interpretation of burnout syndrome is defined by Maslach S. and consists of the three phases: emotional exhaustion (depleted emotional response /indifference), depersonalization, which is characterized by cynical and negative interaction with people, and reduction of professional achievements when there is a decrease in professional efficiency [3].

Traditionally, medical employees are at risk of burnout, since their activities involve significant emotional and physical energy costs. The National Report of Medscape Doctors for 2020 on burnout

and suicide reports that the level of burnout in the medical environment reaches 43% [4]. This problem was particularly aggravated by the situation with the COVID-19 pandemic [5]. According to a systematic review of the literature, which combined research results from all five continents, medical workers began to report more often about all three components of burnout, fatigue and low job satisfaction [6].

It is important to note that the burnout of medical staff represents a significant economic burden within the entire national health system: the state's losses on training specialists, medical errors, and "unsaved" patients can amount to billions [7]. A meta-analysis by Al-Ghunaim T.A. et al., combining the results of 9 studies in which more than 27 thousand respondents participated, showed a 2.5-fold risk of involvement of burned-out surgeons in a situation with a medical error [8]. That is, when we talk about emotional burnout in doctors, we are talking about a decrease in professional qualifications or professional burnout.

It should be emphasized that the interest of the scientific community in the issue of professional burnout is also reflected in the increase in the number of publications devoted to this topic. According to the "burnout" query in the "PubMed" database, there has been an exponential increase in reports in the periodic medical literature over the past 10 years.

Taking into account the relevance and prevalence of the presented problems, the Council of young scientists of the RNMRC of Coloproctology of the Health Ministry of Russia initiated a public survey of medical staff covering several specialties and regions for the prevalence and stage of emotional burnout. Additionally, a search for risk factors was carried out in order to identify the most vulnerable category of employees.

PATIENTS AND METHODS

From June to August 2022, an observational one-stage cross-sectional study was conducted using a case-control analysis. For this purpose, a population survey of medical workers was conducted using a test diagnostic method. The validated questionnaire "Maslach Burnout Inventory", adapted in Russia by Vodopyanova N.E., is taken as a basis. The questionnaire is supplemented with data on age, gender, length of medical activity (including the period of internship/residency training), position, specialization, type of institution and medical care provided. The respondents were also asked to answer the following questions: "What causes you stress at work the most?", "How do you cope with stress after work?", and independently to assess their level of emotional burnout on a scale from 1 to 10 points. The presented adapted questionnaire was designed in electronic Google form and posted in medical communities on social networks.

Maslach's questionnaire consists of 22 multiple-choice questions with 7 possible answers: "Never", "Very rarely", "Rarely", "Sometimes", "Often", "Very often", "Every day". For correctness and convenience of perception, these answer options are transformed into a scale from 0 to 6 points. Based on the answers received, the values of the severity of emotional exhaustion, depersonalization and reduction of professional achievements were calculated by the first stage by summation of points. The second stage was the calculation of the validated integral burnout index based on a mathematical model. The obtained value of the integral index served to stratify the respondents by the level of burnout into "extremely low", "low", "medium", "high" and "extremely high". In order to exclude related mental states, a "high" level of burnout was studied as an outcome (an integral index of more than 70).

The study included only doctors of different specialties from the beginning of work after graduation or from the moment of admission to residency. Doctors who do not carry out medical activities were excluded from the study.

In order to standardize statistical processing, doctors are divided into 3 subgroups of specialties: surgery, therapy and pediatrics. Also, respondents are classified depending on their position, type of medical institution and medical care provided.

After collecting and structuring the data in the Excel database, descriptive statistics were produced with absolute values for categorical data. The calculation of the primary outcome — the level of burnout for different categories of doctors. Numerical data, after checking for the correctness

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Факторы риска эмоционального выгорания   Risk factors of burnout among physicians (results of public survey)
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Table 1. *Descriptive statistics*

Variable	N = 852
Females/males	705 (83%)/147 (17%)
Up to 35 years old	736 (86%)
Median age (Q1; Q3), years	29 (27;33)
Median length of medical activity (Q1;Q3), years	5 (3; 9)
Resident	78 (9%)
Postgraduate	26 (3%)
Polyclinic doctor	411 (48%)
Hospital doctor	251 (29%)
Managers	86 (10%)
Surgery	257 (30%)
Therapy	452 (53%)
Pediatrics	143 (17%)
Municipal institution	590 (69%)
Private medical organization	107 (13%)
Federal clinic	155 (18%)
Planned medical care	358 (42%)
Work in ambulance	66 (8%)
Combined medical care	428 (50%)
Assessment of one's EB level (Q1;Q3), points	7 (5, 8)

of the distribution, are presented as a median with an indication of the interquartile range. Further, to conduct a case-control analysis, the respondents were divided into a group of "high" burnout and a control group — without burnout.

A comparative analysis of categorical data was performed using the exact Fisher's criterion or χ^2. For numerical variables, the nonparametric Mann-Whitney's criterion is applied (taking into account the incorrect distribution of data in the sample). Before factor analysis, a ROC-analysis was performed for continuous variables, a critical value was obtained and the data was converted to dichotomous (yes/no). A univariate analysis was carried out for all variables using the Fisher exact test, the values of odds ratios (OR) with coincidence intervals (CI) were obtained to search for potential risk factors. Factors with the revealed statistical significance are included in the logistic regression formula, and independent factors of a high level of burnout with OR values are identified. Statistical significance was assumed at $p > 0.05$. Statistical analysis was performed using the software "GraphPadPrism 9" (USA). Additionally, a nomogram was constructed with the inclusion of factors identified in the logistic regression to obtain a statistical model using the "R" language.

Given the observational nature of the study, there was no need for a preliminary calculation of the

sample size. The data are presented in accordance with the requirements for publications of STROB Estatement observational studies [9].

RESULTS

A total of 1,018 people was interviewed, of whom 852 respondents were included in the analysis. Nursing staff (n = 50) and non-practicing physicians (n = 116) were excluded from the study. The professional characteristics of the surveyed doctors are also presented (Table 1).

Certain components of burnout (including those with low and average levels) were noted in 553 (65.0%) doctors, while elements of depersonalization were registered in 307 (36.0%), and reductions of professional achievements — in 237 (27.8%) doctors. Based on the high degree of one or another indicator, an integral index was calculated, according to which respondents were assigned to the burnout group (high and extremely high index) or to the control group (medium, low risk and no burnout). The primary outcome — a high overall level of burnout was registered in 269 (32.0%) respondents. The median of the integral burnout index was 67 (52;79) points.

After dividing all respondents into groups of case (high burnout) and control, a comparative analysis

Table 2. *Results of comparative and univariate analyses*

Variable	Burnout 269	Control 583	P	OR (95% CI)
Age	29 (27–33)	29 (27–33)	0.6	-
Length of medical activity	5 (3–9)	5 (3–9)	0.8	-
Female gender	234 (87%)	471 (81%)	0.03*	1.6 (1.1–2.4)
Surgery	68 (25%)	189 (32%)	0.04*	0.7 (0.5–0.9)
Therapy	153 (57%)	299 (51%)	0.1	1.2 (0.9–1.7)
Pediatrics	48 (18%)	95 (16%)	0.6	1.1 (0.8–1.6)
Resident	19 (7%)	59 (10%)	0.2	0.7 (0.4–1.2)
Postgraduate	5 (2%)	21 (4%)	0.2	0.5 (0.2–1.3)
Policlinic doctor	158 (58%)	253 (43%)	< 0.0001*	1.9 (1.4–2.5)
Hospital doctor	65 (24%)	186 (32%)	0.02*	0.7 (0.5–0.9)
Manager	22 (8%)	64 (11%)	0.2	0.7 (0.4–1.2)
Municipal institution	208 (77%)	382 (65%)	0.0006*	1.8 (1.3–2.5)
Private medical organization	29 (11%)	78 (13%)	0.3	0.8 (0.5–1.2)
Federal clinic	32 (12%)	123 (21%)	0.001*	0.5 (0.3–0.8)
Planned care	105 (39%)	253 (43%)	0.2	0.8 (0.6–1.1)
Work in ambulance	20 (7%)	45 (7%)	0.9	0.9 (0.5–1.6)
Combined care	143 (53%)	285 (49%)	0.2	1.2 (0.9–1.6)
What causes you the most stress at work?				
Paperwork	194 (72%)	366 (63%)	0.008*	1.5 (1.1–2.1)
Overtime work	184 (68%)	314 (54%)	< 0.0001*	1.8 (1.4–2.5)
Remuneration of labor	203 (75%)	390 (67%)	0.01*	1.5 (1.1–2.1)
Uneven management planning	165 (61%)	255 (44%)	< 0.0001*	2 (1.5–2.7)
Severe patients	133 (42%)	177 (30%)	0.001*	1.6 (1.2–2.2)
Relationships in the team	69 (26%)	101 (17%)	0.005*	1.6 (1.1–2.3)
How do you deal with stress after work?				
Alcohol	59 (22%)	116 (20%)	0.5	1.1 (0.8–1.6)
Time alone	152 (56%)	271 (46%)	0.008*	1.5 (1.1–2.0)
Time with family	107 (40%)	377 (65%)	< 0.0001*	0.3 (0.2–0.5)
Sports	54 (20%)	212 (36%)	< 0.0001*	0.4 (0.3–0.6)
Videogames	22 (8%)	43 (7%)	0.7	1.1 (0.6–1.9)
Meditation	14 (5%)	68 (12%)	0.002*	0.4 (0.2–0.7)
Sleep	196 (73%)	436 (75%)	0.5	0.9 (0.6–1.2)
Talking about own problems	39 (14%)	125 (21%)	0.02*	0.6 (0.4–0.9)

of all variables was performed, as well as a univariate analysis (Table 2).

Based on the results of the univariate analysis, potential burnout risk factors were identified, which were divided into professional and personal, on the basis of which forest plotgraphs were constructed (Fig. 1, 2).

Variables that have reached statistical significance are included in the logistic regression model, a multivariate analysis is carried out (Table 3).

As a result of the logistic regression of the statistical reliability of predicting high burnout, there were the following factors: "doctors in polyclinic", "overtime work", "uneven planning of activities by management", "severe patients", "relationships in the team", "time with family", "sports", "meditation" and "talking about own problems ". This logistic model is stable and reliable (AUC — 0.77 (0.73–0.79), *p* < 0.0001).

As a result of logistic regression, a nomogram was constructed in order to build a model of the maximum risk of burnout (Fig. 3).

In the presented nomogram, each of the identified factors corresponds to a certain number of points on the upper scale.

To obtain a quantitative assessment of the influence of the indicator, a perpendicular line is drawn to the upper point scale.

After that, the points received are summed up. Then a perpendicular line is drawn from the total

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Table 3. *Model of logistic regression*

Factor	OR (95% CI)	p
Female gender	0.8 (0.5–1.2)	0.3
Surgery	0.9 (0.6–1.4)	0.8
Policlinic doctor	1.9 (1.2–3.1)	0.006*
Hospital doctor	1.1 (0.6–1.7)	0.8
Municipal institution	1.2 (0.7–2.1)	0.4
Federal institution	0.9 (0.5–1.9)	0.9
Paperwork	1.3 (0.9–1.9)	0.2
Overtime work	1.6 (1.2–2.4)	0.006*
Remuneration of labor	1.4 (0.9–1.9)	0.1
Uneven management planning	1.9 (1.3–2.6)	0.0004*
Severe patients	1.6 (1.1–2.3)	0.008*
Relationships in the team	2.1 (1.4–3.2)	0.0002*
Time alone	1.1 (0.7–1.4)	0.8
Time with family	0.3 (0.2–0.4)	< 0.0001*
Sports	0.4 (0.3–0.6)	< 0.0001*
Meditation	0.4 (0.2–0.7)	0.005*
Talking about own problems	0.6 (0.4–0.9)	0.01*

number of points to the lower scale, reflecting the cumulative risk of burnout, expressed as a fraction of one.

DISCUSSION

Emotional burnout of medical workers is a significant health problem in connection not only with the involvement of medical staff, but also of secondary medical personnel [10, 14]. Despite the importance and undoubted vulnerability of nurses in burnout, given certain specifics of the work, the data of the nursing staff who participated in the study were excluded from the analysis to form a homogeneous group of respondents.

852 medical staff members from different regions of Russia took part in our study. According to the specialized literature, from 30 to three thousand respondents take part in similar surveys, which, in general, confirms the representative nature of our study [11].

According to the data obtained during the survey, the overall rate of emotional burnout at all levels was 65%, which is slightly higher than the results of the earlier analysis by Chemali Z. et al., according to which the overall burnout rate of medical staff is from 40 to 60% [12]. This fact is explained
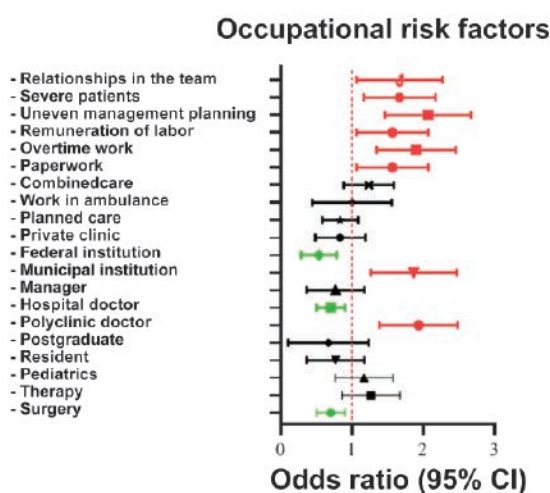
Figure 1. *Professional risk factors of burnout (forest plot)*
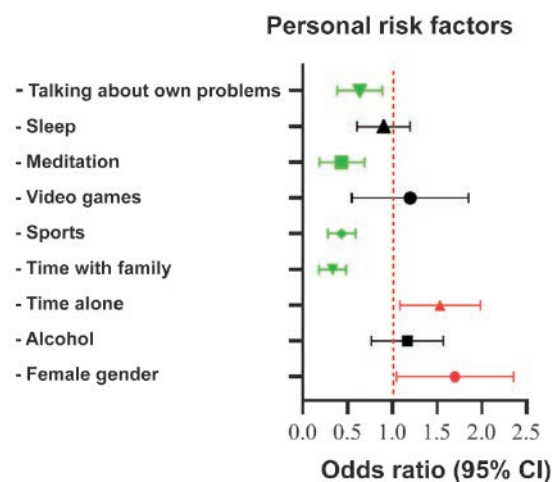
Figure 2. *Personal risk factors of burnout (forest plot)*

by the COVID-19 pandemic, which aggravated the emotional background of the population as a whole, but also directly affected the medical professional community [5, 6]. The structure of the burnout components obtained by us reflects the previously obtained data by Doraiswamy S.B. and co-authors, who combined the results of 78 studies that collected data from a survey of 16,016 doctors, according to which the cumulative prevalence of emotional exhaustion among doctors is estimated at 44.26%, 37.83% of whom have depersonalization and 36.57% have a reduction in professional achievements [11]. This fact reflects the reproducibility of the results obtained by us and the possibility of their extrapolation to the general population.

An important aspect of our study is the bias towards young respondents, which is explained by the most active users of social networks through which the questionnaire was distributed; however, according to the results obtained, age did not have a significant impact on the emotional working status. Doraiswamy S. et al. appeal to similar assumptions of the results bias: despite statistically significant differences according to some of the 78 studies included in the work, age and gender have lost their significance in a multivariate analysis [11]. However, according to the results of the analysis by Castañeda-Aguilera E., it is the

young age (less than 40 years) that is a significant risk factor for burnout in surgeons. Nevertheless, within the framework of this study, the importance of the negative impact of working with cancer patients, night shifts in the emotional exhaustion of the doctor, especially in women, but also the positive role of the protective mechanism of family status in professional activity was also proved [13].

The risk factors studied by us have previously been independently covered in specialized literature and confirmed by the results of meta-analyses [8, 11, 13]. However, the novelty of our research lies in the development of the first predictive model of the risk of a high degree of burnout in domestic and foreign practice (according to a search query in the PubMed database).

A significant limitation of this study is the possible bias of the results in the form of the respondents' desire to fill out a questionnaire in order to change the circumstances when self-diagnosing signs of emotional burnout. This is evidenced by the achievement of statistically significant values in the positive correlation of self-assessment of one's level of emotional burnout and the integral indicator.

Another significant limitation of the study is the audit in the context of the COVID-19 pandemic, which in itself leaves a background imprint on the
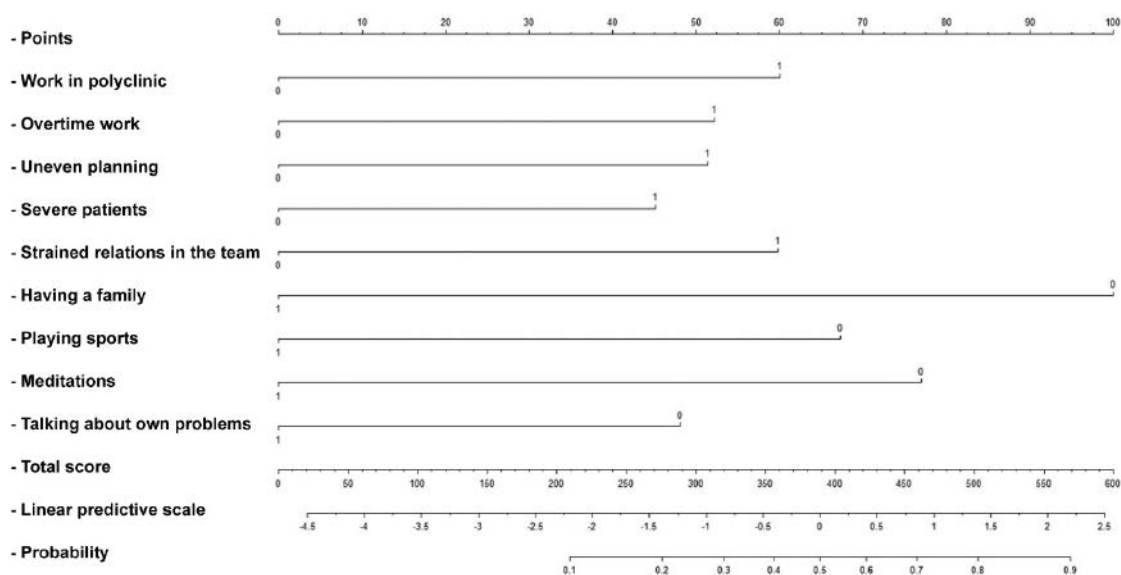

Figure 3. *Predictive nomogramof risk of burnout*

atmosphere in the medical community and enhances the professional emotional background of respondents [15].

Summing up, despite the limitations of our study, the results obtained, based on a representative sample, are able to attract the attention of the professional community to the problem and, possibly, in the future, develop a set of measures to prevent burnout and the appropriate organization of the work of medical personnel. From a practical point of view, it is advisable to use the proposed nomogram for the timely identification of the most vulnerable specialists.

CONCLUSION

The prevalence of a high degree of emotional burnout in Russia among doctors reaches 32%.
The most significant occupational risk factors are strained relationships in the team, overwork, work in polyclinic, work with severe patients, and uneven planning of work activities. Factors of protection against burnout are the presence of a family, passion for sports, meditation and talking about own problems. The developed nomogram is an effective tool for assessing the probability of a high degree of burnout.

AUTHORS CONTRIBUTION
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