SÉRIE "Lékařské vědy"

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BURNOUT SCREENING SCALE FOR INTERNS

Abstract. This article presents the development and evaluation of a self-assessment tool for measuring the severity of burnout syndrome in general practice - family medicine interns. The study involved 32 first-year interns who voluntarily participated in the research, which was conducted in compliance with ethical principles set out in the Helsinki Declaration and the Universal Declaration on Bioethics and Human Rights. The study involved the development of a questionnaire, the survey of respondents, and statistical processing of results. The tool's reliability and validity were evaluated using correlation, regression, and ROC analyses. The results showed that a significant percentage of interns had low levels of resilience, while a smaller percentage had high levels of burnout and low

resilience, indicating the most unfavorable prognostic profile. The developed questionnaire can identify a group at risk of developing burnout, with a score of 3 indicating a risk of burnout and 4 or more indicating the formation of the burnout construct in a medical intern. The findings of this study have important implications for the development of interventions to prevent and manage burnout among medical interns.

Key words: burnout syndrome, interns, GP/FM, screening scale.

Formulation of the problem. The organization of the work process and mutual relations in the team play a leading role in the formation of a high-quality young specialist, within the framework of which, as a qualified specialist, there are certain risks of developing burnout syndrome (BS).[1,2,3] The phenomenon of BS causes pressure on the economic well-being of countries and the state of health of the population.[4,5]

The need to address the problem of worker burnout is legally enshrined in the European Union Framework Directive on Health and Safety (89/391/EEC), and research in recent years has drawn attention to the problems of BS in medical personnel in the under-30 cohort.[6] The lack of targeted initiatives to improve internship conditions and adaptation in the working environment of interns can cause problems, from the devaluation of the professional achievements of young specialists to finding another place of work, changing professions.[7] Recognition of the existence of this problem by the organizers of the health care system is the first step on the way to its solution. In our opinion, the conscious consolidation of the prestige of the position of an intern doctor in society is an important way for integration into the European educational space.[8,9]

Assessment of the severity of BS manifestations has always been a problem for the scientific community, and the search for quick and effective screening diagnostic tools continues today, which actualizes the study of self-assessment of BS manifestations directly among intern doctors.[10,11]

Aim: To develop and evaluate the validity of a self-assessment tool for measuring the severity of burnout syndrome in general practice - family medicine interns.

Materials and methods: 32 first-year general practice - family medicine interns voluntarily participated in the study. The research procedure fully complied with the generally accepted norms of morality, requirements for observing the rights, interests, and personal dignity of the study participants, in accordance with the principles of bioethics set out in the Helsinki Declaration "Ethical Principles for Medical Research Involving Human Subjects" and the "Universal Declaration on Bioethics and Human Rights (UNESCO)".

Design of the study:

I. Development of a questionnaire (standard questionnaire + author's questions, as a tool for developing a screening scale with an explanation of the term "burnout syndrome" (BS) and its symptoms).

II. Survey of respondents.

III. Statistical processing of results:

A. Evaluation of questionnaire results according to the MBI HSS (MP) and CD RISC 25 questionnaires.

B. Distribution of respondents into 5 profiles of burnout syndrome.

IV. Evaluation of reliability and validity of the tool:

A. Correlation analysis to identify possible connections between the self-assessment score of burnout symptoms (the probability of the tool's effectiveness).

B. Regression and ROC analysis (validity of the tool's effectiveness).

The survey was conducted anonymously using a printed version of the questionnaire and lasted approximately 12 minutes. On the first page of the questionnaire, before the survey procedure, respondents were provided with the following information: the definition of burnout syndrome and its symptoms.

In accordance with the aim and objectives of the current research, we used the Maslach Burnout Inventory Human Services Survey for Medical Personnel (MBI HSS (MP)) questionnaire, which consists of 22 questions and 1 author's question: "Please rate the extent to which you experience burnout syndrome on a scale from 0 to 10, where 0 indicates the absence of burnout symptoms and 10 indicates the most severe symptoms." [12] Adding a question about the self-assessment of the presence and severity of burnout syndrome, based on previously provided information on the nature and manifestations of burnout syndrome in individuals (objective self-assessment of burnout symptoms), will allow us to develop a screening scale that, if the reliability and reproducibility of the results are confirmed in practice, will indicate the emergence of a new additional tool for predicting and early diagnosing burnout syndrome in medical interns.

In accordance with the recommendations of the authors of the MBI HSS (MP) questionnaire, all study participants were divided into 5 profiles: "Burnout" (high score on the emotional exhaustion and depersonalization scales according to the Maslach questionnaire), "Engaged" (low score on the emotional exhaustion and depersonalization scales, high score on the personal accomplishment scale), "Overloaded" (high score only on the emotional exhaustion scale), "Disengaged" (due to cynicism), and "Ineffective" (low score on the professional accomplishment scale). This approach does not provide a single clear metric, but rather considers all three subscales to distinguish burnout patterns from other problematic life circumstances.[13] The "Engaged" profile does not exhibit any burnout symptoms, while the "Overloaded," "Ineffective," and "Disengaged" profiles are intermediate and subject to correction. Respondents who fall under the criteria of the "Burnout" profile are more likely to have burnout syndrome.

In accordance with the recommendations for standardizing the assessment of burnout symptoms in different groups, critical limits (standardized z-scores) were calculated for each group of respondents in a specific situation, which allows us to conclude the presence of burnout in that particular group. Thus, the categorization of an individual's profile may differ somewhat depending on the population used to calculate the critical limit. The calculation formulas are presented below:

High emotional exhaustion at $z = M + (SD * 0.5)$

High depersonalization/cynicism at $z = M + (SD * 1.25)$

High professional effectiveness (personal achievement) at $z = M + (SD * 0.10)$

In contrast to the state of "burnout," the concept of "resilience" is formed in the individual's personality structure - the process and result of successful adaptation to difficult or complex life circumstances, especially through mental, emotional, and behavioral flexibility and adjustment to external and internal demands (American Psychological Association). Resilience is not inherited from generation to generation, but rather is a manifestation of an individual's adaptive ability that develops and improves throughout life based on acquired experience and the formation of coping strategies (positive learned experience). Recent research shows that a high level of resilience among physicians is associated with a reduction in burnout, increased job satisfaction, higher tolerance for general and clinical uncertainty, and a sense of accomplishment.

The state of resilience was assessed using the Connor Davidson Resilience Scale 25 (CD RISC 25) questionnaire. The CD RISC 25 score can range from 0 to 100, with higher scores indicating better results. The following gradations of results were used: 80 or higher - high level, 70-79 - average, below 70 - low.

The following statistical methods were used in the statistical processing of the obtained information: checking the normality of the data distribution using the Shapiro-Wilk method, calculation of relative and mean values, determination of correlation relationships using the Pearson test (r), one-way ANOVA with Bonferroni correction and Student's t-test for group comparison, ROC analysis with determination of the optimal cut-off point (OCP) - the value of the indicator for the prognosis, and simple logistic regression with odds ratio calculation.

The value of the area under the ROC curve was interpreted in terms of diagnostic accuracy (Šimundić A-M., 2009): 0.9-1.0 - excellent, 0.8-0.9 - very good, 0.7-0.8 - good, 0.6-0.7 - moderate, 0.5-0.6 - unsatisfactory; a value of 0.5 indicated the prognostic unsuitability of the marker. ROC analysis data were presented as the mean value of the area under the ROC curve (AUC) with its 95% confidence interval (95% CI), sensitivity (Se) and specificity (Sp) indices, corresponding to the discrimination point.

Statistical processing of the results was performed using biostatistical methods implemented in software packages Microsoft Excel (Office Home Business

2KB4Y6H9DB-BM47K-749PV-PG3KT) and STATISTICA 6.1 (StatSoftInc., serial number AGAR909E415822FA). ROC analysis was performed using the MedCalc Statistical Software trial version 20.1.0 (MedCalc Software bvba, Ostend, Belgium; https://www.medcalc.org; 2022).

Results and discussion. After processing the survey results according to MBI HSS (MP), the following data were obtained (Table 1).

Table 1

Results of the survey of interns using the MBI HSS (MP)

Components of burnout syndrome	Low level n (%)	Middle level n (%)	High level n (%)
Emotional exhaustion	5 (15%)	14 (44%)	13 (41%)
Depersonalization	7 (22%)	10 (31%)	15 (47%)
Reduction of personal achievements	12 (38%)	9 (28%)	11 (34%)

According to our data, 7 interns (22%) obtained high levels on all components of the MBI HSS, indicating that they already exhibit symptoms of this syndrome. On the other hand, 1 male intern had normal levels on all components of the burnout test.

The results of the distribution of interns by profiles are presented in diagram 1.
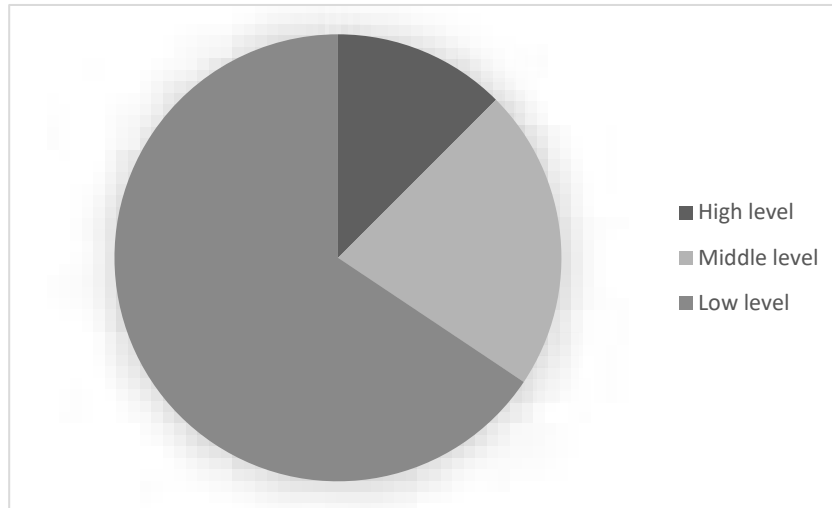
Diagram 1
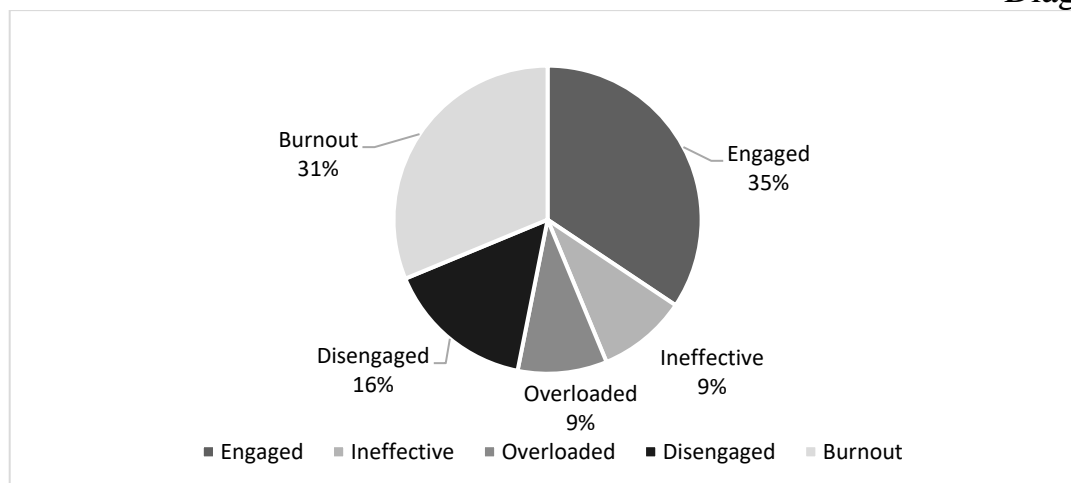
When distributing the interns by profiles, it was found that 11 (34%) respondents corresponded to the "Engaged" profile, 3 (9%) to "Ineffective", 3 (9%) to "Overloaded", 5 (16%) to "Disengaged", and 10 (32%) to "Burnout" (the most unfavorable prognostic profile).

The assessment of young professionals by the level of resilience is presented in diagram 2.
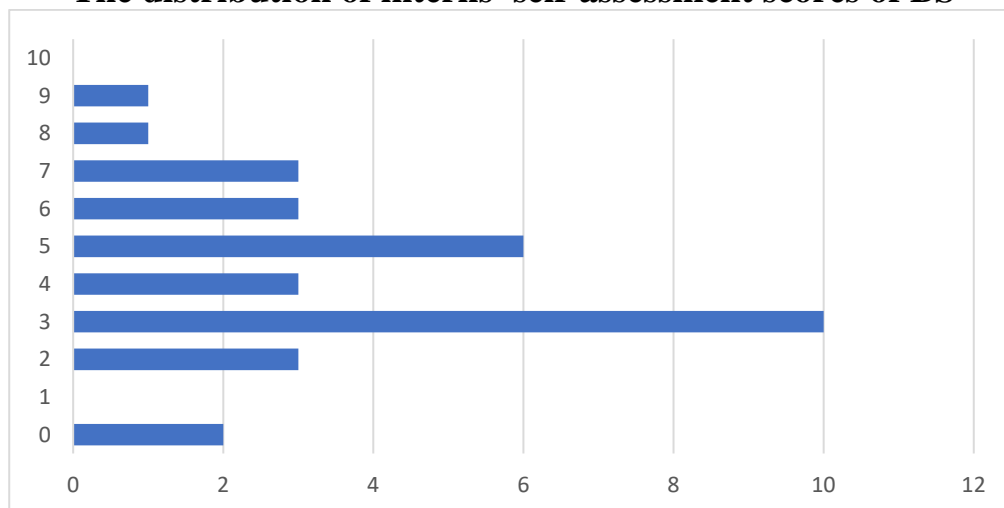
Diagram 2

The distribution of interns' resilience levels according to CD RISC 25

The distribution of self-assessment scores of BS expressed from 0 to 10 is presented on diagram 3.

Diagram 3

The distribution of interns' self-assessment scores of BS

To achieve the goal of the actual study, a correlation analysis was conducted with a clarification of the relationships between the self-assessment score and the results of the questionnaire on burnout syndrome in medical personnel, as well as the resilience indicator (Table 2).

Table 2

Correlation links between three components of burnout syndrome according to the MBI HSS (MP) questionnaire and the score of self-evaluation of burnout syndrome severity

	Self-evaluation of burnout syndrome severity	
	r	p-value
Emotional exhaustion	0,738	0,000001
Depersonalization	0,419	0,017009
Reduction of personal achievements*	-0,460	0,008044
Resilience	-0,471	0,006564

* the scale of reduction of professional achievements is inversely proportional, i.e. the higher the number of points on this scale, the less pronounced is the reduction of the professional abilities of the respondent

Thus, the higher the score of self-evaluation of burnout syndrome severity in first-year internal medicine residents of the "GP/FM" specialty, the higher the level of emotional exhaustion (r=0.000001), depersonalization/cynicism (r=0.017009), and reduction of professional achievements (r=0.008044). Resilience values have an inverse relationship with the score of self-evaluation of burnout syndrome severity, indicating a possible resistance to the process of professional burnout among internal medicine residents due to the positive experience gained from their own lives.

At the IV stage of the study, the comparison of different burnout syndrome profiles according to the MBI HSS (MP) questionnaire was conducted using ANOVA analysis. Taking into account that the "Overloaded" profile is characterized by a high level of emotional exhaustion only, the "Disengaged" profile is characterized only by cynicism, and the "Ineffective" profile is characterized by a devaluation of professional achievements, which most likely has a characterological or psychological basis of personality, and a small number of respondents in these groups have high levels of burnout syndrome rating according to these scales, it was a rational decision to include them in the "Intermediate Results" group (n=11), as these participants do not correspond to the combination of burnout syndrome features but have high levels according to one or another scale.

ANOVA analysis regarding the difference between the three groups based on the level of self-evaluation demonstrated that there is no statistically significant difference between the "Engaged" and "Intermediate Results" groups (p=0.091952), as well as between the "Burnout" and "Intermediate Results" groups (p=0.231017).

The groups "Engaged" and "Burnout" have a statistically significant difference (p=0.002551). We further compared the "Engaged" and "Burnout" groups using the Student's t-test and found that there is a significant difference between the

mean scores of self-assessment on the manifestation of burnout syndrome (BS) in interns after 1 year of training in the "Engaged" group M (SD) 2.8333 (1.85047) 95% CI (1.6576 - 4.0091) and the "Burnout" group 6.0000 (1.73205) 95% CI (4.3981 - 7.6019) (exceeding the mean value of the "Burnout" group by 2 times).

The next step was to conduct logistic regression and ROC analysis to determine the optimal cut-off point (OCP) for the self-assessment score on the manifestation of BS and the dichotomous indicator in Model 1 (which allows detecting respondents who have high levels of certain components of BS or already have manifestations of the holistic BS), where "0" is for respondents assigned to the "Engaged" group and "1" is for those assigned to the "Intermediate results" and "Burnout" groups [14.

Model 2 was developed to identify interns who have manifestations of all components of BS. In this model, it is assumed that "0" refers to respondents who were assigned to the "Engaged" and "Intermediate results" groups, and "1" refers to those assigned to the "Burnout" group. The results are presented in Table 3.

Table 3

Results of ROC analysis and simple logistic regression analysis

|	AUC	95 % CI AUC	p value	Se	Sp	OCP	95 % CI
Model 1	0,800	0,621 - 0,920	0,0003	70	75	>3	2,0505 (1,1487 - 3,6602)
Model 2	0,820	0,644 - 0,933	0,0006	85,71	68,00	>4	1,8967 (1,0998 - 3,2711)

Both models have very good diagnostic accuracy and can be used as a screening tool to identify interns who have symptoms of burnout syndrome.

In other words, if a first-year intern rates their expression of burnout syndrome symptoms as greater than 3.0, with a sensitivity of 70% and specificity of 75%, they will have a high score in at least one subscale of the MBI HSS (MP) questionnaire. If they rate their expression at 4.0 or higher, with a sensitivity of 85.7% and specificity of 68%, it can be concluded that they are experiencing symptoms of burnout syndrome.

The ROC curves of the self-assessment scores of burnout syndrome severity predict the risk of burnout syndrome presence
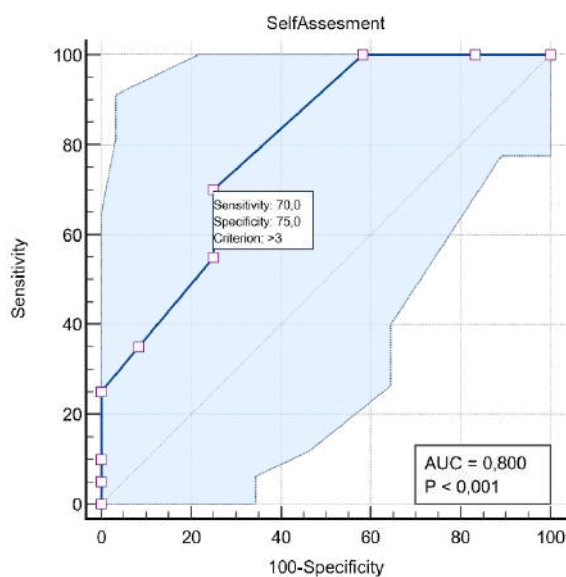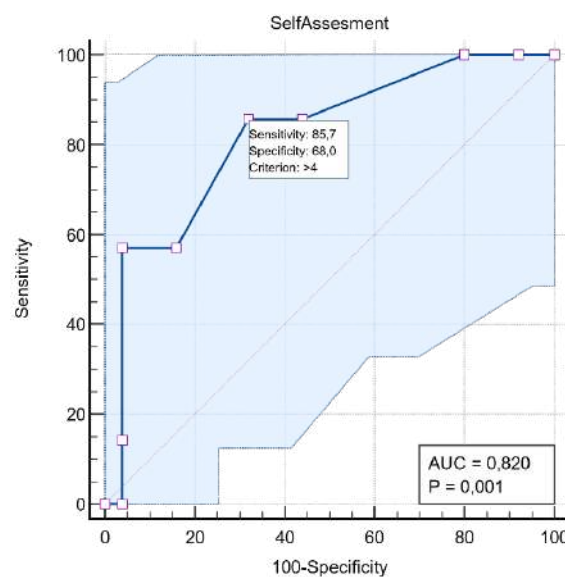
Model 1   *Model 2*

Thus, an 11-point (ranging from 0 to 10) self-assessment test of the severity of symptoms of burnout syndrome in medical interns can be recommended as an additional valid screening tool for diagnosis, allowing identification of those who require correction of this psychological phenomenon (when self-assessed at 3.0 or more points on the self-assessment scale).

Conclusions:

1.   Only 3% of respondents (1 male intern) had normal levels on all indicators of the burnout test.

2.   66% of medical interns had low levels of resilience, which may indicate a lack of positive coping strategies.

3.   22% had high levels on all components of burnout and low resilience, which is the most unfavorable prognostic profile.

4.   Individuals with high levels of resilience had low levels of emotional exhaustion and low levels of professional achievement reduction ($p<0.01$).

5.   The developed questionnaire for self-assessment of burnout can identify a group at risk of developing burnout among medical interns. A score of 3 indicates a risk of burnout (high values on one component), while 4 or more indicates the formation of the burnout construct in a medical intern (Se=85.71%, Sp=68.00%).

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