UDC 614.2
DOI: 10.21668/health.risk/2025.2.13.eng

Read online

Research article

# MANAGING THE RISK OF LOW JOB SATISFACTION AND PROFESSIONAL BURNOUT OF GENERAL PRACTITIONERS

**A.B. Zudin, M.A. Kuznetsova, T.P. Vasilyeva**

N.A. Semashko National Research Institute of Public Health, 12 Vorontsovo Pole St., build. 1, Moscow, 105064, Russian Federation

*Increased work requirements accompanied by a long period of continuous exposure are the most common predictors of burnout syndrome among healthcare workers. The great variability of Russian and foreign data on prevalence of burnout among healthcare workers indicates some unaccounted factors determining different levels of the studied phenomenon as well as unresolved evaluation and technological approaches to its early prevention within healthcare personnel management.*

*The aim of the study was to create a model for predicting and managing the risks of occupational burnout among general practitioners. A survey was conducted among general practitioners (n = 340) employed at healthcare institutions in Moscow in the period from 2022 to 2023. The survey relied on using the Russian version of the international psychosocial questionnaire COPSOQ III (Long version) adapted for healthcare workers. Burnout levels in doctors with low job satisfaction were determined with reliability $p \leq 0.05$ by the Kruskal – Wallis test. Prediction was calculated by using linear regression analysis; models of qualitative target variables were calculated using the Decision Tree method. Relative risks and odds ratio (95 % CI) were calculated as a quantitative measure of effects.*

*Statistically significant differences per 38 psychosocial factors were confirmed at $p < 0.0001$. In a representative sample of doctors with low job satisfaction, those with the high level of burnout accounted for 1.72 %; 'Norm', 43.10 %; 'Low', 55.18 %. On the example of the Decision Tree model, the study described an algorithm for managing evaluation parameters of low job satisfaction, which was significant for managing risks of occupational burnout in general practitioners and depended on intra-organizational psychosocial factors 'Uncertainty over Working Conditions', 'Work Life Conflicts' and 'Depressive symptoms' and contributed to an increase up to 80 % or decrease down to 3.0 % depending on their impact in an occupational environment.*

*The study findings substantiate the fact that an increase in medical and social effectiveness of healthcare workers can be based on employing developed organizational technologies for preventing critical levels of low job satisfaction and occupational burnout in general practitioners as well as declining quality of rendered healthcare services. The risk management algorithm offers to consider levels of job dissatisfaction, occupational burnout and the factors with the greatest influence of psychosocial working conditions and individual traits of general practitioners.*

***Keywords:*** *burnout, job satisfaction, psychosocial risk factors, general practitioners, prognosis, risk management models, human resources, evaluation prevention technologies.*

The World Health Organization (WHO) conceptualizes burnout as a syndrome resulting from chronic workplace stress that has not been successfully managed[1]. According to the International statistical classification of diseases and related health problems, eleventh revision (ICD-11)[2], three symptoms define the entity: (i) feelings of energy depletion or exhaustion; (ii) increased mental distance from one's job or feelings of negativism or cynicism towards one's job; and (iii) a sense of ineffectiveness and lack of accomplishment. The ICD-11 includes burnout among the factors influencing health status or contact with health



**Alexander B. Zudin** – Doctor of Medical Sciences, director (e-mail: info@nriph.ru; ORCID: http://orcid.org/0000-0002-6966-5559).

**Maria A. Kuznetsova** – Junior Researcher (e-mail: mascha.kuznetsova@yandex.ru; tel.: +7 (926) 878-06-67; ORCID: http://orcid.org/0000-0001-8243-5902).

**Tatyana P. Vasilyeva** – Doctor of Medical Sciences, Professor, Chief Researcher **(**e-mail: vasileva_tp@mail.ru; ORCID: http://orcid.org/0000-0003-4831-1783).

[1] Burnout an «occupational phenomenon»: International Classification of Diseases. *World Health Organization*, 2019. Available at: https://www.who.int/news/item/28-05-2019-burn-out-an-occupational-phenomenon-international-classification-of-diseases (February 27, 2025).

[2] ICD-11 for Mortality and Morbidity Statistics. QD85 Burnout. *WHO*. Available at: https://icd.who.int/browse/2025-01/mms/en#129180281 (February 27, 2025).

services, which is classified as an occupational phenomenon and not as a medical condition [1, 2]. Burnout is a serious global issue among general practitioners (GPs). According to many estimates, high prevalence of burnout among doctors varies between 6 and 33 % across the globe [3]. Some studies report the level of emotional exhaustion among doctors to vary between 37 and 88.6 %; depersonalization, between 28 and 82.8 %; it is within the range between 19.6 and 29.28 according to doctors' self-esteems [3, 4].

Healthcare workers are established to be especially susceptible to burnout due to long periods of intense work and close contacts with other people [5, 6].

Burnout can create elevated risks of medical errors involving potential damage to patient safety and is associated with developing negative outcomes including cynicism, exhaustion, and depression [7, 8]. Some studies report burnout to be associated with such medical conditions as depression, anxiety, sleep disorders, cognitive disorders, cardiovascular diseases, and metabolic disorders[3] [9].

Therefore, burnout should be considered a serious healthcare challenge, which should be investigated and assessed for developing and implementing relevant preventive measures and, if necessary, medical interventions [10–12].

At the same time, high prevalence of burnout among doctors is known to increase financial burdens for the healthcare system due to low labor productivity, absences from work, change of a specialty or even an occupation, that is, loss of human resources [13–15].

Preservation of human resources and doctors' occupational efficiency is vital; given that, mitigation of intra-organizational and individual occupational risk factors is an effective strategy for managing human resources and occupational factors determining their well-being.

Given all the above stated, **the aim of this study** was to create a model for predicting psychosocial risks of low job satisfaction and occupational burnout among general practitioners for scientific substantiation of a thesis that intra-organizational processes in healthcare institutions aimed at their prevention were quite manageable.

**Materials and methods.** Within this study, correlation and regression analysis were conducted, relative risk (*RR*) and odds ratio (*OR*) were calculated using the international questionnaire COPSOQ III (Long version) to establish cause-effect relations between predictors of low job satisfaction and occupational burnout among GPs. Psychosocial risks of low job satisfaction and burnout were analyzed based on calculating the cutoff points of the upper bound of the inter-quartile interval – 75 % and higher (Q3 >) (the interquartile range or IQR). To check the test accuracy, specificity (*ST*) and sensitivity (*Se*) were determined per each risk factor. We employed the analysis of binary indicators of risk classes using the Decision Tree method. Parameters of error detection tests made for ratios between multiple factors were analyzed using ROC-curves. Initial data were analyzed with Statistica 10 software package using qualitative and quantitative statistics methods.

The study was approved at a meeting of the Independent Ethics Committee of the N.A. Semashko's National Research Institute of Public Health (Protocol No. 2 dated May 17, 2022). Informed consent was received from all participants.

**Results and discussion.** Factors determining different levels of such indicators as 'Job Satisfaction' and 'Burnout' in GPs were investigated relying on 37 psychosocial factors included in the COSPOQ III (long version) (Table 1).

'Burnout' was shown to have a close interrelation with all factors determining 'Job Satisfaction'. A direct proportional interrelation was established between this indicator and 15 significant factors influencing development of burnout among doctors (Quantitative

[3] Melamed S., Ugarten U., Shirom A., Kahana L., Lerman Y., Froom P. Chronic burnout, somatic arousal and elevated salivary cortisol levels. *J. Psychosom. Res.*, 1999, vol. 46, no. 6, pp. 591–598. DOI: 10.1016/s0022-3999(99)00007-0

Table 1

Interrelations between psychosocial risk factors, 'Job Satisfaction' and 'Burnout'

| Psychosocial factors | Job satisfaction | Burnout |
|---|---|---|
| Quantitative demands | -0.46** | 0.39** |
| Work pace | -0.09 | 0.31** |
| Cognitive demands | -0.08 | 0.33** |
| Emotional demands | -0.28** | 0.43** |
| Demands for hiding emotions | -0.17** | 0.24** |
| Influence at work | 0.34** | -0.27** |
| Possibilities for development | 0.42** | -0.28** |
| Variation of work | 0.17** | -0.28** |
| Control over working time | 0.28** | -0.37** |
| Meaning of work | 0.10 | 0.13* |
| Predictability | 0.43** | -0.16** |
| Recognition | 0.66** | -0.46** |
| Role clarity | 0.51** | -0.22** |
| Role conflicts | -0.51** | 0.32** |
| Illegitimate tasks | -0.53** | 0.41** |
| Quality of leadership | 0.68** | -0.47** |
| Social support from supervisors | 0.58** | -0.47** |
| Social support from colleagues | 0.46** | -0.38** |
| Sense of community at work | 0.53** | -0.37** |
| Commitment to the workplace | 0.7** | -0.45** |
| Work engagement | 0.44** | -0.16** |
| Job insecurity | -0.2** | 0.28** |
| Insecurity over working conditions | -0.34** | 0.37** |
| Quality of work | 0.48** | -0.2** |
| Job satisfaction | 1 | -0.5** |
| Work life conflicts | -0.35** | 0.34** |
| Horizontal trust | 0.22** | -0.17** |
| Vertical trust | 0.49** | -0.3** |
| Organizational justice | 0.67** | -0.56** |
| Health | 0.34** | -0.34** |
| Self-rated health | 0.38** | -0.44** |
| Sleeping troubles | -0.47** | 0.69** |
| Burnout | -0.5** | 1 |
| Stress | -0.5** | 0.65** |
| Somatic stress | -0.42** | 0.59** |
| Cognitive stress | -0.48** | 0.5** |
| Depressive symptoms | -0.57** | 0.56** |
| Self-efficacy | 0.38** | -0.29** |

Note: * $p = 0.05$; ** $p = 0.01$.

Demands, Work Pace, Cognitive Demands, Emotional Demands, Demands for Hiding Emotions, Meaning of Work, Role Conflicts, Job Insecurity, Insecurity over Working Conditions, Work Life Conflicts, Sleeping Troubles, Stress, Somatic Stress, Cognitive Stress, Depressive Symptoms); an inverse relation was established for 21 factors with insignificant influence (labeled with the minus in the list) in healthcare institutions in Moscow ($p \leq 0.01$).

Based on the interquartile range, three groups were created with different levels of influence exerted by the analyzed psychosocial factors on 'Burnout': 'Low' ($n = 77$), 'Norm' ($n = 205$), and 'High' ($n = 58$) with substantiation provided for authentic differences between them (Table 2).

Table 2

Comparison between three groups for ‘Burnout’ per psychosocial factors

| Psychosocial factors | M ± S (*N* = 77) Low | M ± S (*N* = 205) Norm | M ± S (*N* = 58) High | *P-level* | | | |
|---|---|---|---|---|---|---|---|
| | | | | *df* = 2 | Low – Norm | Low – High | Norm – High |
| Quantitative demands | 143.18 ± 68.90 | 183.54 ± 65.54 | 214.22 ± 56.02 | <0.0001 | <0.0001 | <0.0001 | 0.0097 |
| Work pace | 197.86 ± 75.70 | 241.05 ± 48.42 | 250.81 ± 56.53 | <0.0001 | 0.0001 | <0.0001 | 0.2389 |
| Cognitive demands | 289.52 ± 67.62 | 314.94 ± 54.28 | 340.52 ± 47.49 | <0.0001 | 0.0192 | <0.0001 | 0.0033 |
| Emotional demands | 165.74 ± 65.97 | 219.48 ± 47.80 | 238.53 ± 57.27 | <0.0001 | <0.0001 | <0.0001 | 0.0478 |
| Demands for hiding emotions | 253.57 ± 77.56 | 281.10 ± 54.62 | 290.95 ± 48.15 | 0.0010 | 0.0102 | 0.0029 | 0.4425 |
| Influence at work | 293.51 ± 110.50 | 223.66 ± 66.25 | 225.00 ± 72.55 | <0.0001 | <0.0001 | 0.0004 | 0.9987 |
| Possibilities for development | 219.48 ± 50.27 | 195.49 ± 37.47 | 183.62 ± 34.90 | <0.0001 | 0.0011 | <0.0001 | 0.0959 |
| Variation of work | 81.17 ± 31.97 | 68.54 ± 25.92 | 62.50 ± 27.41 | <0.0001 | 0.0017 | 0.0002 | 0.2939 |
| Control over working time | 164.94 ± 109.29 | 103.05 ± 69.44 | 84.91 ± 78.49 | <0.0001 | <0.0001 | <0.0001 | 0.0490 |
| Meaning of work | 172.40 ± 35.02 | 178.66 ± 26.17 | 182.33 ± 25.22 | 0.2165 | 0.6160 | 0.2792 | 0.6170 |
| Predictability | 155.84 ± 42.32 | 149.76 ± 34.30 | 140.52 ± 28.42 | 0.0087 | 0.2696 | 0.0148 | 0.1530 |
| Recognition | 213.96 ± 52.64 | 175.85 ± 39.40 | 150.86 ± 40.00 | <0.0001 | <0.0001 | <0.0001 | 0.0030 |
| Role clarity | 265.58 ± 38.05 | 246.83 ± 35.04 | 241.81 ± 31.20 | <0.0001 | 0.0010 | 0.0012 | 0.6458 |
| Role conflicts | 69.48 ± 42.07 | 92.32 ± 36.95 | 103.02 ± 35.69 | <0.0001 | 0.0003 | <0.0001 | 0.0931 |
| Illegitimate tasks | 46.10 ± 29.54 | 70.00 ± 22.33 | 72.84 ± 21.60 | <0.0001 | <0.0001 | <0.0001 | 0.5964 |
| Quality of leadership | 268.18 ± 80.67 | 217.44 ± 65.15 | 164.66 ± 61.96 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Social support from supervisors | 190.58 ± 62.44 | 148.17 ± 41.64 | 112.07 ± 44.73 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Social support from colleagues | 182.79 ± 56.52 | 150.49 ± 40.82 | 130.17 ± 46.54 | <0.0001 | <0.0001 | <0.0001 | 0.0353 |
| Sense of community at work | 250.00 ± 41.16 | 215.98 ± 35.58 | 205.17 ± 34.01 | <0.0001 | <0.0001 | <0.0001 | 0.1871 |
| Commitment to the workplace | 352.60 ± 100.62 | 277.32 ± 79.58 | 225.00 ± 87.61 | <0.0001 | <0.0001 | <0.0001 | 0.0006 |
| Work engagement | 221.43 ± 51.89 | 212.56 ± 36.93 | 196.98 ± 40.31 | 0.0032 | 0.3179 | 0.0044 | 0.0446 |
| Job insecurity | 181.49 ± 81.15 | 220.98 ± 50.72 | 234.05 ± 53.33 | <0.0001 | 0.0028 | 0.0001 | 0.1592 |
| Insecurity over working conditions | 242.53 ± 111.22 | 342.07 ± 82.14 | 346.98 ±100.34 | <0.0001 | <0.0001 | <0.0001 | 0.9179 |
| Quality of work | 158.12 ± 31.53 | 154.51 ± 27.25 | 141.81 ± 29.01 | 0.0026 | 0.6300 | 0.0125 | 0.0343 |
| Job satisfaction | 343.18 ± 59.69 | 283.90 ± 61.06 | 242.24 ± 58.90 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |

End of the Table 2

| Psychosocial factors | M ± S (*N* = 77) Low | M ± S (*N* = 205) Norm | M ± S (*N* = 58) High | *P-level* | | | |
|---|---|---|---|---|---|---|---|
| | | | | *df* = 2 | Low – Norm | Low – High | Norm – High |
| Work life conflicts | 188.64 ± 106.57 | 280.00 ± 91.87 | 276.72 ±119.56 | <0.0001 | <0.0001 | <0.0001 | 0.9776 |
| Horizontal trust | 162.01 ± 63.43 | 142.80 ± 40.83 | 126.29 ± 32.92 | 0.0202 | 0.7259 | 0.0360 | 0.0718 |
| Vertical trust | 256.82 ± 67.94 | 225.61 ± 51.54 | 207.33 ± 46.36 | <0.0001 | 0.0001 | <0.0001 | 0.1060 |
| Organizational justice | 246.10 ± 67.26 | 174.27 ± 64.45 | 119.40 ± 56.01 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Health | 68.18 ± 22.45 | 61.59 ± 19.72 | 46.55 ± 18.99 | <0.0001 | 0.1004 | <0.0001 | <0.0001 |
| Self-rated health | 8.17 ± 1.39 | 7.48 ± 1.53 | 6.24 ± 1.30 | <0.0001 | 0.0055 | <0.0001 | <0.0001 |
| Sleeping troubles | 90.26 ± 55.33 | 173.17 ± 66.14 | 255.60 ± 72.55 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Burnout | 118.51 ± 45.78 | 243.05 ± 36.93 | 349.57 ± 28.29 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Stress | 79.55 ± 40.50 | 125.61 ± 47.00 | 181.47 ± 38.78 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Somatic stress | 59.09 ± 46.40 | 113.29 ± 60.56 | 176.29 ± 65.80 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Cognitive stress | 37.66 ± 46.70 | 84.15 ± 58.46 | 117.24 ± 55.84 | <0.0001 | <0.0001 | <0.0001 | 0.0010 |
| Depressive symptoms | 48.05 ± 56.16 | 103.54 ± 58.60 | 163.79 ± 63.38 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Self-efficacy | 406.18 ± 136.01 | 364.04 ±114.26 | 298.14 ± 96.36 | <0.0001 | 0.0499 | <0.0001 | 0.0006 |

Table 3

Intergroup comparisons of ‘Burnout’ and ‘Job Satisfaction’ levels in GPs

| Level of Job Satisfaction among GPs | Level of Burnout among GPs | | | *p*, (*df* = 4) |
|---|---|---|---|---|
| | Low (*N* = 77) | Norm (*N* = 205) | High (*N* = 58) | |
| Norm | 47 (61.04 %) | 142 (69.27 %) | 25 (43.10 %) | < 0.0001 |
| Low | 3 (3.90 %) | 42 (20.49 %) | 32 (55.17 %) | |
| High | 27 (35.06 %) | 21 (10.24 %) | 1 (1.72 %) | |

Bearing in mind that ‘Burnout’ was authentically associated with ‘Job Satisfaction’ among general practitioners, we analyzed and established authentic correlations between these two indicators in the comparison groups ‘Low’, ‘Norm’ and ‘High’ levels (Table 3). The results are visualized in Figure 1.

Regression analysis with ‘Job Satisfaction’ as the leading factor and ‘Burnout’ as the dependent one was conducted based on the correlation between ‘Job Satisfaction’ and ‘Burnout’ ($r$ = -0.5, $p < 0.0001$) (Figure 2).

‘Burnout’ was shown to decline on average by 0.59 scores as ‘Job Satisfaction’ grew; the regression model was able to explain 24.1 % of this dispersion ($R^2 = 24.1$, $p < 0.0001$).

The established data with the confirmed authentic correlation between ‘Burnout’ and ‘Jib Satisfaction’ factors among GPs were additionally used in multifactorial analysis to establish significance ranks of factors determining low job satisfaction among GPs (Table 4).

The analysis reliably established 35 factors and their values that increased the risk of low job satisfaction among GPs.

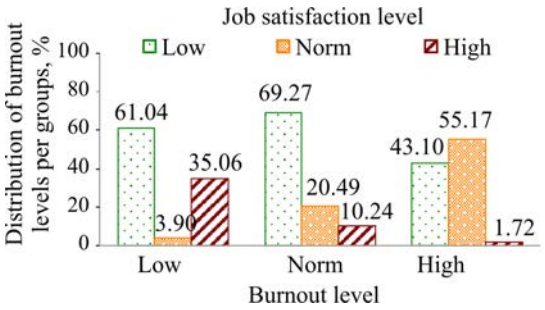


Figure 1. Distribution of 'Job Satisfaction' levels in 'Burnout' groups

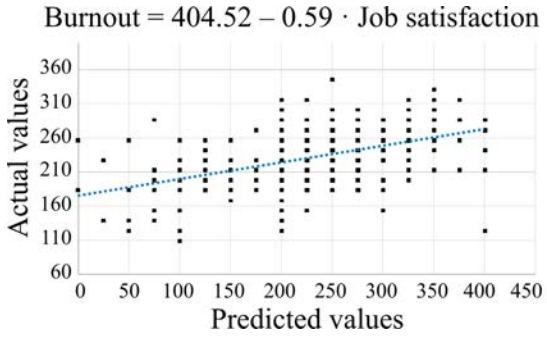


Figure 2. An average change in 'Burnout' when 'Job Satisfaction' grows

Table 4

Distribution of psychosocial factors of low job satisfaction

| Psychosocial factors | *RR* (95 % CI) | *OR* (95 % CI) | AuR OC | *Se*, % | *Sp*, % | *p* (*df* = 1) |
|---|---|---|---|---|---|---|
| Burnout ≥ 250.0 | 22.48 (9.41; 53.72) | 56.70 (22.34; 43.87) | 0.88 | 96.27 | 68.73 | <0.0001 |
| Depressive symptoms ≥ 125.0 | 8.31 (5.04; 13.68) | 20.21 (11.08; 36.88) | 0.88 | 88.81 | 71.81 | <0.0001 |
| Stress ≥ 150.0 | 5.67 (3.75; 8.55) | 12.73 (7.49; 21.64) | 0.86 | 83.58 | 71.43 | <0.0001 |
| Sleeping troubles ≥ 200.0 | 6.08 (3.91; 9.48) | 13.30 (7.66; 23.10) | 0.84 | 85.82 | 68.73 | <0.0001 |
| Cognitive stress ≥ 100.0 | 5.85 (3.80; 9.01) | 12.75 (7.41; 21.96) | 0.83 | 85.07 | 69.11 | <0.0001 |
| Job satisfaction< 275.0 | 4.4 (3.11; 6.24) | 9.72 (5.96; 15.85) | 0.83 | 76.87 | 74.52 | <0.0001 |
| Insecurity over working conditions ≥ 375.0 | 3.94 (2.82; 5.50) | 8.26 (5.12; 13.32) | 0.84 | 74.63 | 73.75 | <0.0001 |
| Organizational justice < 150.0 | 3.58 (2.65; 4.83) | 7.85 (4.91; 12.55) | 0.83 | 67.91 | 78.76 | <0.0001 |
| Quality of leadership < 200.0 | 3.61 (2.65; 4.92) | 7.63 (4.78; 12.18) | 0.78 | 70.15 | 76.45 | <0.0001 |
| Illegitimate tasks ≥ 75.0 | 8.81 (4.45; 17.47) | 16.63 (7.81; 35.37) | 0.81 | 94.03 | 51.35 | <0.0001 |
| Emotional demands ≥ 225.0 | 6.48 (3.71; 11.32) | 12.15 (6.40; 23.07) | 0.85 | 91.04 | 54.44 | <0.0001 |
| Work life conflicts ≥ 275.0 | 3.77 (2.61; 5.43) | 6.99 (4.29; 11.39) | 0.77 | 79.10 | 64.86 | <0.0001 |
| Quantitative demands ≥ 200.0 | 4.08 (2.73; 6.10) | 7.43 (4.44; 12.41) | 0.81 | 82.84 | 60.62 | <0.0001 |
| Recognition < 175.0 | 3.32 (2.40; 4.60) | 6.20 (3.90; 9.87) | 0.80 | 73.13 | 69.50 | <0.0001 |
| Somatic stress ≥ 100.0 | 5.63 (3.23; 9.81) | 9.93 (5.23; 18.86) | 0.81 | 91.04 | 49.42 | <0.0001 |
| Role conflicts ≥ 100.0 | 5.4 (3.03; 9.64) | 9.21 (4.74; 17.89) | 0.78 | 91.79 | 45.17 | <0.0001 |
| Job insecurity ≥ 225.0 | 5.39 (2.93; 9.88) | 9.01 (4.52; 17.96) | 0.80 | 92.54 | 42.08 | <0.0001 |
| Commitment to the workplace < 250.0 | 2.61 (1.99; 3.43) | 4.79 (3.05; 7.52) | 0.76 | 57.46 | 77.99 | <0.0001 |
| Work pace ≥ 250.0 | 2.86 (2.07; 3.95) | 4.84 (3.07; 7.64) | 0.75 | 72.39 | 64.86 | <0.0001 |

End of the Table 4

| Psychosocial factors | *RR* (95 % CI) | *OR* (95 % CI) | AuROC | *Se*, % | *Sp*, % | *p* (*df* = 1) |
|---|---|---|---|---|---|---|
| Social support from supervisors < 150.0 | 2.64 (1.99; 3.50) | 4.66 (2.99; 7.29) | 0.77 | 61.94 | 74.13 | <0.0001 |
| Sense of community at work < 225.0 | 2.66 (1.94; 3.64) | 4.35 (2.77; 6.83) | 0.75 | 70.90 | 64.09 | <0.0001 |
| Control over working time < 75.0 | 2.27 (1.73; 2.98) | 3.72 (2.39; 5.78) | 0.73 | 55.97 | 74.52 | <0.0001 |
| Demands for hiding emotions ≥ 300.0 | 2.39 (1.76; 3.25) | 3.72 (2.39; 5.80) | 0.73 | 68.66 | 62.93 | <0.0001 |
| Cognitive demands ≥ 325.0 | 2.62 (1.83; 3.75) | 4.00 (2.48; 6.46) | 0.74 | 78.36 | 52.51 | <0.0001 |
| Social support from colleagues < 150.0 | 2.25 (1.71; 2.98) | 3.59 (2.32; 5.56) | 0.73 | 58.96 | 71.43 | <0.0001 |
| Self-rated health < 8.0 | 2.26 (1.68; 3.04) | 3.47 (2.24; 5.38) | 0.67 | 65.67 | 64.48 | <0.0001 |
| Self-efficacy < 402.0 | 2.25 (1.62; 3.13) | 3.28 (2.08; 5.17) | 0.69 | 73.88 | 53.67 | <0.0001 |
| Vertical trust < 225.0 | 2.01 (1.50; 2.69) | 2.90 (1.88; 4.46) | 0.69 | 63.43 | 62.55 | <0.0001 |
| Health < 75.0 | 1.87 (1.40; 2.50) | 2.59 (1.68; 3.98) | 0.63 | 63.43 | 59.85 | <0.0001 |
| Quality of work < 150.0 | 1.83 (1.40; 2.40) | 2.81 (1.67; 4.74) | 0.68 | 29.10 | 87.26 | <0.0001 |
| Possibilities for development < 200.0 | 1.72 (1.30; 2.27) | 2.28 (1.49; 3.50) | 0.67 | 58.96 | 61.39 | 0.0001 |
| Influence at work < 225.0 | 1.72 (1.29; 2.28) | 2.28 (1.49; 3.49) | 0.68 | 59.70 | 60.62 | 0.0001 |
| Role clarity < 275.0 | 1.89 (1.33; 2.70) | 2.51 (1.55; 4.05) | 0.63 | 78.36 | 40.93 | 0.0001 |
| Variation of work < 75.0 | 1.46 (1.11; 1.92) | 1.79 (1.17; 2.72) | 0.60 | 53.73 | 60.62 | 0.0066 |
| Work engagement < 225.0 | 1.36 (1.03; 1.79) | 1.59 (1.05; 2.42) | 0.59 | 55.97 | 55.60 | 0.0296 |
| Predictability < 150.0 | 1.3 (0.97; 1.72) | 1.50 (0.95; 2.38) | 0.62 | 32.09 | 76.06 | 0.0834 |
| Meaning of work ≥ 200.0 | 1.19 (0.90; 1.57) | 1.30 (0.85; 1.98) | 0.58 | 56.72 | 49.81 | 0.2196 |
| Horizontal trust < 150.0 | 0.98 (0.74; 1.30) | 0.97 (0.64; 1.48) | 0.59 | 41.79 | 57.53 | 0.8971 |

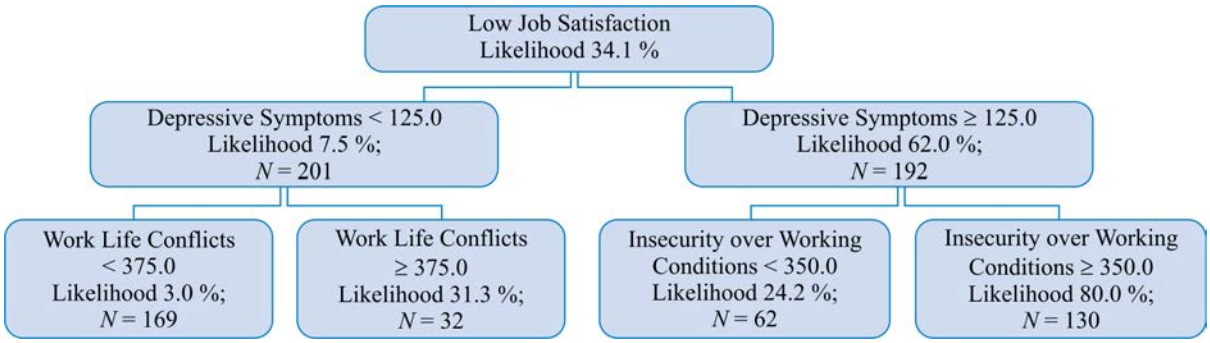


Figure 3. Risk classes in 'Low Job Satisfaction' group of GPs

Table 5

Error detection tests to check quality of the Decision Tree model per risk classes of low job satisfaction among GP

| Indicator | Values |
|---|---|
| Cutoff point | 24.2 % |
| AuROC | 0.92 |
| Sensitivity | 95.9 % |
| Specificity | 77.4 % |
| Effectiveness | 86.6 % |
| Positive Predictive Value | 70.7 % |
| Negative Predictive Value | 97.0 % |

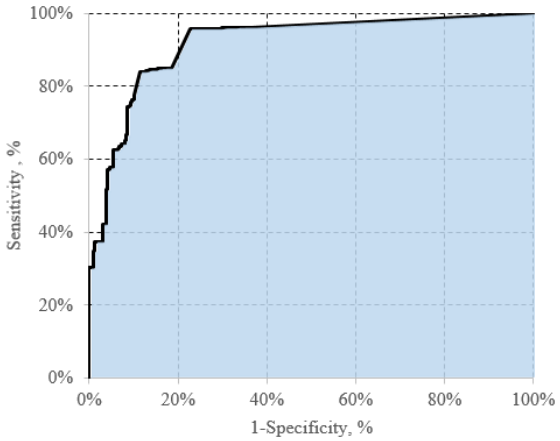


Figure 4. ROC-graph of the Decision Tree model per the calculated parameters of factors determining low job satisfaction among GPs

Using the Decision Tree model as an example, we created an algorithm for predicting low job satisfaction among GPs depending on parameters of risk classes 'Depressive Symptoms' determined by 'Work Life Conflicts' and 'Insecurity over Working Conditions' (Figure 3).

As shown by the Decision Tree model, different values of parameters of risk classes result in changes of likelihood of low job satisfaction among GPs. Thus, if 'Depressive Symptoms' factor value is (≥) 125.0 scores and 'Insecurity over Working Conditions' factor value is (≥) 350.0 scores, then likelihood of 'Low Job Satisfaction' grows up to 80 %.

When 'Depressive Symptoms' factor value is (<) 125.0 scores and 'Work Life Conflicts' factor value is (<) 375.0 scores, likelihood of 'Low Job Satisfaction' goes down to 3.0 %.

Error detection tests were conducted to check quality of the Decision Tree model per risk classes of low job satisfaction among GP. They were characterized with high sensitivity equal to 95.9 % (Table 5).

The following ROC-graph visualizes the conducted error detection tests for the Decision Tree model of low job satisfaction among GPs (Figure 4).

The obtained data made it possible to substantiate low job satisfaction among up to 34.1 % of general practitioners who rendered primary medical and sanitary aid to population in healthcare institutions in Moscow (M.A. Kuznetzova with colleagues, 2024) [16, 17]. Given that, it is quite justifiable to assert that the extreme job dissatisfaction is a reliable predictor of occupational burnout.

Our findings are also consistent with results reported in other studies (K.E. Erenzhan and others, 2021), where emotional burnout was established in 35 % of general practitioners; of them, 37 % had medium level of burnout and 14 % had high level of burnout [18].

In some studies, effects produced by interventions on burnout and associated symptoms are estimated based on specific stress reduction programs (V. Minichiello et al., 2020) [19]. Other studies (S. Prentice et al., 2025) report effectiveness of psychosocial interventions (for example, a decline in depersonalization or higher personal achievements) just after their implementation ($g_w$ = 0.243, 95 % CI [-0.042; 0.529]) [20]. However, these results were not authentically significant ($p$ = 0.090) for the total sample and a wide prediction range made it possible to assume that in future similar interventions could have an opposite (negative) effect and only strengthen burnout symptoms among doctors [21–24].

The scientific society in general and healthcare administrators in particular are actively discussing actions able to raise doctors' medical and social effectiveness by developing psychosocial strategies aimed at managing burnout symptoms [20, 25, 26]. However, the state of this problematic research area is limited by sampling performed among specialized healthcare branches and still lacks relevant methodical and technological development of management decisions at the stage when a healthcare institution enters the first contact with patients. We have not been able to find available research publica-

tions that described predictive models on managing psychosocial risk factors causing low job satisfaction and negative outcomes of occupational burnout among GPs. This calls for further applied research on the subject.

The suggested algorithms for predictions within management of low job satisfaction risks for doctors were taken into account in development and subsequent testing of organizational technologies aimed at preventing risks of declining job satisfaction and growing burnout among GPs. They included the following consequent stages:

– recognizing an existing problem of GPs' low job satisfaction and patients' low satisfaction with quality of healthcare services rendered to them (parallel surveys among GPs (COPSOQ III questionnaire, shot version) and patients (Europep questionnaire));

– creating a schedule of meetings with GPs, where the first meeting with the leadership involved discussing goals and development strategy of healthcare institutions; GPs were offered to create a focus group and present their conceptual plan how to develop their department for discussing intermediate results;

– establishing a 'problem' zone in routine work and ways to correct it;

– developing a KPI (**Key Performance Indicators**) system based on calculating the ratio between the number of received patients and the number of patients satisfied with quality of medical aid, as well as filling in mandatory documents without errors;

– implementing a CRM-system (**Customer Relationship Management**) aimed at simplifying work with patients and documents;

– creating a rest room and organizing psychological relief trainings;

– drawing up a schedule for occupational training for doctors (skills development or seeking an academic degree), developing tutorship for young specialists as well as plans for participating in theoretical and practical conferences and professional competitions.

In addition, short breaks of 5–7 minutes were introduced in work schedules each 1.5 hours; some activities were planned involving team-building trips.

Intermediate results were to be discussed two days a week in 40-minute sessions.

Effectiveness of organizational activities was estimated per 16 psychosocial factors of job satisfaction among GPs; the estimation results showed its growth from 4.54 to 27.28 % over three months; a decline in 'Burnout' amounted to 24.09 % [27].

Our test results are similar to open data obtained by international human resources practices adopted by healthcare institutions. Thus, a study by S. Park et al. (2023) showed that doctors' job satisfaction depended on a management strategy adopted by a healthcare institution ($R^2$ = 13.67, $p < 0.0001$) and investments in education and training ($R^2 = 7.96$, $p < 0.0001$) [28]. A systemic review by B.A. Clough et al. (2017) comprises data on 23 studies, which indicate that positive effects were created by implementation of unique programs aimed at preventing influence of psychosocial factors of doctors' burnout, from $d = 0.08$ to $d = 1.08$ [29]. A later systemic review by P. Catapano et al. (2023) revealed effectiveness of organizational technologies at the individual and organizational levels with use of cognitive-psychological therapy and relaxation techniques [30].

Therefore, the suggested model for predicting risks of low job satisfaction and growing occupational burnout among general practitioners employed in healthcare institutions in Moscow has been created based on selecting, analyzing, and assessing the most significant general and unique factors related to working conditions. It makes it possible to apply a systemic approach to reducing occupational psychosocial burdens for healthcare workers by increasing medical and social effectiveness of activities performed by a healthcare institution.

**Conclusion.** Using the Decision Tree model as an example, we have shown an algorithm for managing estimated parameters of low job satisfaction among general practitioners; it is significant for managing risks of burnout and depends on intra-organizational psychosocial factors. Occupational factors typical for healthcare institutions in Moscow have been shown to create high scores per such components as 'Insecurity over Working Condi-

tions', 'Work Life Conflicts' and 'Depressive Symptoms'. The developed organization technologies for preventing critical levels of low job satisfactions and burnout were used as a basis to show that intra-organizational occupational conditions were quite manageable. Depending on frequency and intensity of internal interrelations, risks were decreased by up to 3 %.

The suggested risk management algorithm considers the most significant factors related to psychosocial working conditions and GPs' individual peculiarities that determine a decline in medical and social effectiveness of human resources in a healthcare organization.

**Funding.** The study was not granted any sponsor support.

**Competing interests.** The authors declare no competing interests.

## References

1. Bianchi R., Schonfeld I.S. Examining the evidence base for burnout. *Bull. World Health Organ.*, 2023, vol. 101, no. 11, pp. 743–745. DOI: 10.2471/BLT.23.289996

2. Guseva Canu I., Marca S.C., Dell'Oro F., Balázs Á., Bergamaschi E., Besse C., Bianchi R., Bislimovska J. [et al.]. Harmonized definition of occupational burnout: A systematic review, semantic analysis, and Delphi consensus in 29 countries. *Scand. J. Work Environ. Health*., 2021, vol. 47, no. 2, pp. 95–107. DOI: 10.5271/sjweh.3935

3. Karuna C., Palmer V., Scott A., Gunn J. Prevalence of burnout among GPs: a systematic review and meta-analysis. *Br. J. Gen. Pract*., 2022, vol. 72, no. 718, pp. e316–e324. DOI: 10.3399/BJGP.2021.0441

4. Shen X., Xu H., Feng J., Ye J., Lu Z., Gan Y. The global prevalence of burnout among general practitioners: a systematic review and meta-analysis. *Fam. Pract*., 2022, vol. 39, no. 5, pp. 943–950. DOI: 10.1093/fampra/cmab180

5. Jun J., Ojemeni M.M., Kalamani R., Tong J., Crecelius M.L. Relationship between nurse burnout, patient and organizational outcomes: systematic review. *Int. J. Nurs. Stud*., 2021, vol. 119, pp. 103933. DOI: 10.1016/j.ijnurstu.2021.103933

6. The Lancet. Physician burnout: a global crisis. *Lancet*, 2019, vol. 394, pp. 93. DOI: 10.1016/S0140-6736(19)31573-9

7. Owoc J., Mańczak M., Jabłońska M., Tombarkiewicz M., Olszewski R. Association Between Physician Burnout and Self-reported Errors: Meta-analysis. *J. Patient Saf*., 2022, vol. 18, no. 1, pp. e180–e188. DOI: 10.1097/PTS.0000000000000724

8. Zaed I., Jaaiddane Y., Chibbaro S., Tinterri B. Burnout Among Neurosurgeons and Residents in Neurosurgery: A Systematic Review and Meta-Analysis of the Literature. *World Neurosurg*., 2020, vol. 143, pp. e529–e534. DOI: 10.1016/j.wneu.2020.08.005

9. Saleh P., Shapiro C.M. Disturbed sleep and burnout: implications for long-term health. *J. Psychosom. Res*., 2008, vol. 65, no. 1, pp. 1–3. DOI: 10.1016/j.jpsychores.2008.05.028

10. Azzopardi-Muscat N., Zapata T., Kluge H. Moving from health workforce crisis to health workforce success: the time to act is now. *Lancet Reg. Health Eur*., 2023, vol. 35, pp. 100765. DOI: 10.1016/j.lanepe.2023.100765

11. Woo T., Ho R., Tang A., Tam W. Global prevalence of burnout symptoms among nurses: a systematic review and meta-analysis. *J. Psychiatr. Res*., 2020, vol. 123, pp. 9–20. DOI: 10.1016/j.jpsychires.2019.12.015

12. Dubale B.W., Friedman L.E., Chemali Z., Denninger J.W., Mehta D.H., Alem A., Fricchione G.L., Dossett M.L., Gelaye B. Systematic review of burnout among healthcare providers in sub-Saharan Africa. *BMC Public Health*, 2019, vol. 19, no. 1, pp. 1247. DOI: 10.1186/s12889-019-7566-7

13. Fargen K.M., Arthur A.S., Leslie-Mazwi T., Garner R.M., Aschenbrenner C.A., Wolfe S.Q., Ansari S.A., Dabus G. [et al.]. A survey of burnout and professional satisfaction among United States neurointerventionalists. *J. Neurointerv Surg*., 2019, vol. 11, no. 11, pp. 1100–1104. DOI: 10.1136/neurintsurg-2019-014833

14. Shakir H.J., Cappuzzo J.M., Shallwani H., Kwasnicki A., Bullis C., Wang J., Hess R.M., Levy E.I. Relationship of grit and resilience to burnout among U.S. neurosurgery residents. *World Neurosurg*., 2020, vol. 134, pp. e224–e236. DOI: 10.1016/j.wneu.2019.10.043

15. Thielmann B., Schwarze R., Böckelmann I. A Systematic Review of Associations and Predictors for Job Satisfaction and Work Engagement in Prehospital Emergency Medical Services – Challenges for the Future. *Int. J. Environ. Res. Public Health*, 2023, vol. 20, no. 5, pp. 4578. DOI: 10.3390/ijerph20054578

16. Kuznetsova M.A., Zudin A.B., Gorbacheva N.A. Consequence analysis: Assessment of psychosocial risk factors for burnout in general practitioners as a predictor of patient dissatisfaction with health care in the post-pandemic era. *ZNiSO*, 2024, vol. 32, no. 9, pp. 83–90. DOI: 10.35627/2219-5238/2024-32-9-83-90 (in Russian).

17. Kuznetsova M.A., Vasilyeva T.P., Zudin A.B., Gruzdeva O.A., Kuznetsova K.Yu. Study of factors influencing psychosocial and professional characteristics of general practitioners (family doctors): validation of the international questionnaire COPSOQ III (Long version). *Zdravookhranenie Rossiiskoi Federatsii*, 2024, vol. 68, no. 4, pp. 315–322. DOI: 10.47470/0044-197X-2024-68-4- 315-322 (in Russian).

18. Yerenzhan K.E., Assukhanova M.M., Dilmagambetova G.S., Moldasheva Z.B., Tleuova A.S. General practitioners' emotional burn-out. *West Kazakhstan Medical Journal*, 2021, no. 2 (63), pp. 117–122. DOI: 10.24412/2707-6180-2021- 63-117-122 (in Russian).

19. Minichiello V., Hayer S., Gillespie B., Goss M., Barrett B. Developing a mindfulness skills-based training program for resident physicians. *Fam. Med*., 2020, vol. 52, no. 1, pp. 48–52. DOI: 10.22454/FamMed.2020.461348

20. Prentice S., Patel D.N., Dorstyn D.S. Wellbeing interventions in family medicine and general practice trainees: a preliminary meta-analysis. *Educ. Prim. Care*, 2025, vol. 36, no. 3, pp. 82–93. DOI: 10.1080/14739879.2025.2469494

21. Nathan J., McCray L., Feldman N. The text effect: stress management and resiliency training pilot for resident physicians. *Fam. Med*., 2021, vol. 53, no. 2, pp. 139–144. DOI: 10.22454/FamMed.2021.847102

22. Halista C.E., Dalton H.A., Thornton J.A. Structured curricular change fails to combat resident burnout. *Mil. Med.*, 2024, vol. 189, no. 1–2, pp. 370–373. DOI: 10.1093/milmed/usac188

23. Johnson E., Roth E. Improving physician wellness through electronic health record education. *Int. J. Psychiatry Med*., 2021, vol. 56, no. 5, pp. 327–333. DOI: 10.1177/00912174211034633

24. Villarreal M., Hanson P., Clarke A., Khan M., Dale J. Feasibility, acceptability and effect of the mindful practice curriculum in postgraduate training of general practitioners. *BMC Med. Educ*., 2021, vol. 21, no. 1, pp. 327. DOI: 10.1186/s12909-021-02747-z

25. Khalfin R.A., Smolnikova P.S., Stolkova A.S. Burnout among health care workers: a pressing problem for health care management. *Natsional'noe zdravookhranenie*, 2023, vol. 4, no. 2, pp. 40–46. DOI: 10.47093/2713-069X.2023.4.2.40-46 (in Russian).

26. Shaw E., Nunns M., Spicer S.G., Lawal H., Briscoe S., Melendez-Torres G.J., Garside R., Liabo K., Thompson Coon J. What is the volume, quality and characteristics of evidence relating to the effectiveness and cost-effectiveness of multi-disciplinary occupational health interventions aiming to improve work-related outcomes for employed adults? An evidence and gap map of systematic reviews. *Campbell Syst. Rev*., 2024, vol. 20, no. 2, pp. e1412. DOI: 10.1002/cl2.1412

27. Zudin A.B., Kuznetsova M.A., Vasilyeva T.P., Tyranovets S.V., Kuznetsova K.Yu. The strategic choice of organizational technologies preventing burning out of general practitioners in the system of patient-oriented medicine. *Problemy sotsialnoi gigieny, zdravookhraneniya i istorii meditsiny*, 2024, vol. 32, no. 6, pp. 1234–1242. DOI: 10.32687/0869-866X-2024-32-6-1234-1242 (in Russian).

28. Park S., Kim H.-K., Lee H.-J., Choi M., Lee M., Jakovljevic M. Strategic management and organizational culture of medical device companies in relation to corporate performance. *J. Med. Econ*., 2023, vol. 26, no. 1, pp. 781–792. DOI: 10.1080/13696998.2023.2224168

29. Clough B.A., March S., Chan R.J., Casey L.M., Phillips R., Ireland M.J. Psychosocial interventions for managing occupational stress and burnout among medical doctors: a systematic review. *Syst. Rev*., 2017, vol. 6, no. 1, pp. 144. DOI: 10.1186/s13643-017-0526-3

30. Catapano P., Cipolla S., Sampogna G., Perris F., Luciano M., Catapano F., Fiorillo A. Organizational and Individual Interventions for Managing Work-Related Stress in Healthcare Professionals: A Systematic Review. *Medicina (Kaunas)*, 2023, vol. 59, no. 10, pp. 1866. DOI: 10.3390/medicina59101866

*Zudin A.B., Kuznetsova M.A., Vasilyeva T.P. Managing the risk of low job satisfaction and professional burnout of general practitioners. Health Risk Analysis, 2025, no. 2, pp. 155–165. DOI: 10.21668/health.risk/2025.2.13.eng*

Received: 10.04.2025
Approved: 09.06.2025
Accepted for publication: 26.06.2025