

Original research article

RISK OF BURNOUT SYNDROME IN MEMBERS OF MULTIDISCIPLINARY REHABILITATION TEAMS: VALIDATION OF THE CZECH VERSION OF THE COPENHAGEN BURNOUT INVENTORY

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Abstract

Background: Burnout syndrome is a psychological condition arising from factors such as prolonged stress, emotional strain, and excessive workload. It is most common in helping professions such as physicians, nurses, teachers, and social workers, who work in intensive contact with people.

Objective: To determine the validity and reliability of the Czech version of the Copenhagen Burnout Inventory (CBI) and to provide a culturally adapted version for use among Czech healthcare workers.

Methods: A convenience sample of 51 healthcare workers from multidisciplinary rehabilitation teams was recruited (12 nurses, 7 physicians, 13 physiotherapists, 4 occupational therapists, 6 psychologists, 2 social workers, and 5 others). The scale was administered to subgroups of respondents twice within seven days to verify test-retest reliability. Reliability of the Czech version of the CBI was evaluated using Cronbach's α , and concurrent validity was assessed using Spearman's correlation coefficients.

Results: The Czech version of the CBI demonstrated excellent internal consistency (Cronbach's $\alpha = 0.94$) and very good test-retest reliability (intraclass correlation coefficient [$ICC_{2,1}$] = 0.96; 95% CI: 0.86–0.99). Correlations with the Shirom–Melamed Burnout Measure were moderate to strong.

Conclusion: The Czech version of the CBI showed excellent internal consistency and good concurrent validity with the Shirom–Melamed Burnout Measure. These findings are consistent with international studies and support the use of the Czech version of the CBI in both clinical practice and research.

Keywords: Burnout; Copenhagen Burnout Inventory; Nurses; Physiotherapy; Rehabilitation

INTRODUCTION

Burnout syndrome is a phenomenon of general exhaustion that has been studied since the 1970s around the world. The term “burnout” was first used by the American psychoanalyst Herbert J. Freudenberger in 1974 in the *Journal of Social Issues*. In his work, he focused primarily on the helping professions and described burnout as a process that begins with an intense workload, gradually progresses to

emotional and physical exhaustion, and then to feelings of isolation and frustration. He also emphasized the influence of factors such as lack of support or excessive work demands (Freudenberger, 1974).

Many different definitions of burnout syndrome have been proposed over time, and there is no single universally accepted definition. However, the definitions generally agree that it is a psychological condition characterized by exhaustion and reduced work effective-

ness caused by prolonged and intense stress, most commonly affecting individuals working in direct contact with people (Maslach et al., 2001, Poschkamp, 2011).

Demographic characteristics are also often included among the possible risk factors. Higher rates of burnout syndrome have been reported among women, those living without a partner, younger employees, and those with less experience (Aljabri et al., 2022; El-Ibiary et al., 2017; Maroon, 2021).

Individuals who enter their careers with high motivation and strong expectations of finding meaning in work are particularly susceptible to burnout syndrome. The onset of symptoms is often accompanied by the realization that their efforts are futile, leading to a loss of energy and inability to complete tasks.

Internal (personality-related) factors include character traits, cognitive styles, and dispositions that may increase vulnerability to chronic stress and exhaustion. One frequently mentioned example is the so-called Type A personality, characterized by high responsibility, competitiveness, strong achievement orientation, and low patience (reference needed). External (work-related) factors include unfavorable workplace conditions – such as excessive workload combined with staff shortages or lack of expertise – which can lead to overload and increased pressure on the individual (Grochowska et al., 2022, Pawłowicz-Szlarska et al., 2022; Stock, 2015).

There are many ways to recognize the state of psychological burnout; during a professional psychological examination or, more often, through questionnaires. The most commonly used method to determine the level of burnout is the Maslach Burnout Inventory (MBI), in which burnout is defined by the three components of emotional exhaustion, depersonalization, and decreased personal accomplishment (Maslach and Jackson, 1981). Another questionnaire is the Burnout Measure (Malach-Pines, 2005), Oldenburg Burnout Inventory (Bakker et al., 2007), or Shirom–Melamed (Shirom and Melamed 2006).

Another new alternative tool in the field of diagnostics is the Copenhagen Burnout Inventory (CBI). The key developmental component in this questionnaire is exhaustion and, compared to the MBI, it excludes depersonalization and low job performance from the concept of burnout syndrome. The

authors of this method distinguish between job burnout, personal burnout, and burnout connected with the clients (and communication and relationship with them) (Kristensen et al., 2005).

Although the Maslach Burnout Inventory (MBI) is considered the gold standard for assessing burnout, it is protected by licensing terms and subject to fees. Another potential limitation is the fact that Maslach defined burnout as including both emotional exhaustion and depersonalization. Other studies did not require both components to define burnout, potentially leading to a prevalence overestimation (Ecklebery-Hunt et al., 2018; Maslach et al., 1997).

Our goal was therefore to create and validate a Czech version of the Copenhagen Burnout Inventory, which would enable the assessment of burnout levels among healthcare workers.

MATERIALS AND METHODS

The Copenhagen Burnout Inventory (CBI) is a standardized tool to assess burnout with a focus on physical and psychological exhaustion. This questionnaire has 19 items divided into 3 scales: personal burnout (6 items), work-related burnout (7 items), and client-related burnout (6 items). Each item is scored on a 5-point scale, rated 0, 25, 50, 75, and 100. An average score is calculated for each subscale. There is no precise cut-off score for this scale because, according to the author, no exact threshold can be determined. However, for diagnostic purposes, an average score of ≥ 50 indicates a higher risk of burnout. The subscales are scored separately and not summed. For comparative purposes, the personal burnout subscale is recommended (Kristensen et al., 2005).

The Czech version of the CBI was validated against the official Czech version of the Shirom–Melamed Burnout Measure (Ptáček et al., 2017). This questionnaire consists of 14 items focused on physical exhaustion (6 items), emotional exhaustion (4 items), and cognitive exhaustion (4 items). Each item is rated on a 7-point Likert scale. In addition to individual subscores, a total score can also be calculated. A mean score above 4 indicates burnout (Shoman et al., 2023).

Translation and cross-cultural adaptation

Initially, permission from the author of the CBI was obtained to translate and adapt the scale into Czech. The Copenhagen Burnout Inventory was translated based on recommended guidelines (Guillemin et al., 1993). The first versions of the Czech translation were prepared by two psychologists, one physiotherapist with a good command of English, and a professional translator. These translations were compared, and for each item, the wording judged to represent the original best

was selected. At this stage, cross-cultural adaptation was also performed.

The final version was back-translated into English by an independent professional translator, and the two versions were compared. Satisfactory equivalence with the original scale was achieved by consensus among the translators. This version was then pilot-tested with a group of 10 healthcare professionals to identify and correct any inaccurate wording. The final Czech translation of the questionnaire is in Table 1.

Table 1 – Czech version of Copenhagen Burnout Inventory and it's scoring

		Stále (Always)	Často (Often)	Občas (Sometimes)	Zřídka (Seldom)	Nikdy / Téměř nikdy (Never / Almost never)
1	Jak často se cítíte unavený/á? (How often do you feel tired?)	100	75	50	25	0
2	Jak často se cítíte fyzicky vyčerpaný/á? (How often are you physically exhausted?)	100	75	50	25	0
3	Jak často se cítíte emocionálně vyčerpaný/á? (How often are you emotionally exhausted?)	100	75	50	25	0
4	Jak často vás napadá: „Už to nemůžu vydržet?“ (How often do you think: “I can't take it any more?”)	100	75	50	25	0
5	Jak často se cítíte vyčerpaný/á? (How often do you feel worn out?)	100	75	50	25	0
6	Jak často se cítíte slabý/á a náchylný/á k onemocnění? (How often do you feel weak and susceptible to illness?)	100	75	50	25	0
7	Cítíte se na konci pracovního dne vyčerpaně? (Do you feel worn out at the end of the working day?)	100	75	50	25	0
8	Jste ráno při pomýšlení na další den v práci vyčerpaný/á? (Are you exhausted in the morning at the thought of another day at work?)	100	75	50	25	0
9	Máte pocit, že je pro Vás každá pracovní hodina únavná? (Do you feel that every working hour is tiring for you?)	100	75	50	25	0
10	Máte ve volném čase dost energie pro rodinu a přátele? (Do you have enough energy for family and friends during leisure time?)	0	25	50	75	100

Table 1 – continued

		Stále (Always)	Často (Often)	Občas (Sometimes)	Zřídka (Seldom)	Nikdy / Téměř nikdy (Never / Almost never)
11	Jste unavení z práce s pacienty? (Are you tired of working with clients?)	100	75	50	25	0
12	Přemýšlíte někdy, jak dlouho ještě zvládnete pracovat s pacienty? (Do you sometimes wonder how long you will be able to continue working with clients?)	100	75	50	25	0
		Ve velmi vysoké míře (To a very high degree)	Ve vysoké míře (To a high degree)	Poněkud (Somewhat)	V nízké míře (To a low degree)	Ve velmi nízké míře (To a very low degree)
13	Je pro Vás práce emocionálně vyčerpávající? (Is your work emotionally exhausting?)	100	75	50	25	0
14	Cítíte v práci frustraci? (Does your work frustrate you?)	100	75	50	25	0
15	Cítíte se z práce vyhoření? (Do you feel burnt out because of your work?)	100	75	50	25	0
16	Je pro Vás obtížné pracovat s pacienty? (Do you find it hard to work with clients?)	100	75	50	25	0
17	Vyčerpává Vás práce s pacienty? (Does it drain your energy to work with clients?)	100	75	50	25	0
18	Je pro Vás práce s pacienty nepřijemná? (Do you find it frustrating to work with clients?)	100	75	50	25	0
19	Máte pocit, že při práci s pacienty více dáváte, než dostáváte zpět? (Do you feel that you give more than you get back when you work with clients?)	100	75	50	25	0
Scoring: Personal burnout (items: 1–6), Work-related burnout (items: 7–10, 13–15), Client-related burnout (items: 11, 12, 16–19).						
Note: When filling out the questionnaire, the subject does not have a visible point rating for individual items.						

Study design and participants

The study was approved by the local ethics committee (number 30/25 S-IV AP). Participants were informed about the purpose and procedures of the study, and all of them provided written informed consent. A cross-sectional design was used for this validation study. In line with guidelines for outcome

measures, a minimum sample size of 50 participants was targeted (Terwee et al., 2007).

Data on participants, including demographic characteristics such as age, gender, and professional background, were collected through supplementary questions attached to the CBI and the Shirom–Melamed Burnout Measure.

Data analysis

Descriptive statistics were calculated for participant characteristics and CBI items. Cronbach's α and inter-item correlations were used to assess the reliability of the three CBI subscales. Criterion validity of the CBI was evaluated by testing correlations with the Shirom–Melamed Burnout Measure.

Test-retest reliability was assessed by computing intraclass correlation coefficients ($ICC_{2,1}$) using a 1-week interval in 10 participants. For comparisons between groups, independent-samples t -tests were used. All statistical analyses were performed using SPSS version 22.0 (IBM Corp., Armonk, NY, USA).

RESULTS

Respondents

A total of 51 healthcare professionals (48 women, 3 men) from multidisciplinary rehabilitation teams participated in this validation study (12 nurses, 7 physicians, 13 phy-

siotherapists, 4 occupational therapists, 6 psychologists, 2 social workers, 2 carers, and 5 others). The mean age of responders was 40.9 years ($SD = 11.9$, range 22–63), and the mean length of therapeutic experience was 14.9 years ($SD = 10.1$, range 0.5–38).

Most respondents ($n = 44$; 86.3%) reported that they had encountered burnout syndrome in their practice. Most frequently, they reported witnessing symptoms of burnout in colleagues (45.1%). A total of 19.6% reported personal experience with the syndrome, and 21.6% experienced it themselves and observed it in colleagues (Table 2).

Mean subscale scores were: CBI-personal 47.6 ($SD = 16.7$), CBI-client-related 27.6 ($SD = 21.0$), and CBI-work-related 37.0 ($SD = 19.9$) – details in Table 3.

Overall, 41% of respondents currently perceived burnout as a threat. According to the CBI-personal (Kristensen et al., 2005), 24 participants were classified as being at high risk of burnout. Based on the Shirom–Melamed Burnout Measure, 9 participants met the criteria for burnout.

Table 2 – Demographic characteristics of participants

Profession	Age (years) Mean \pm SD	Years of practice Mean \pm SD	Self- reported experience with burnout	Experience with burnout among colleagues	Currently feeling threatened by burnout
Nurse ($n = 12$)	39.9 \pm 9.6	15.5 \pm 7.1	2	9	1
Doctor ($n = 7$)	41.8 \pm 9.9	16.5 \pm 9.7	5	6	4
Physiotherapist ($n = 13$)	34.3 \pm 9.1	11.0 \pm 9.3	7	11	4
Occupational therapist ($n = 4$)	25.7 \pm 2.5	3.0 \pm 2.9	1	3	1
Psychologist ($n = 6$)	50.5 \pm 9.1	23.0 \pm 5.9	3	4	4
Social worker ($n = 2$)	46.0 \pm 6.0	19.0 \pm 1.0	1	1	1
Carer ($n = 2$)	44.5 \pm 6.5	7.0 \pm 1.0	1	0	1
Others ($n = 5$)	56.2 \pm 9.2	22.9 \pm 13.6	1	3	4
Total ($n = 51$)	40.9 \pm 11.9	14.9 \pm 10.1	21 (41.1%)	37 (72.5%)	20 (39.2%)

Psychometric properties

The Czech version of the CBI demonstrated excellent internal consistency (Cronbach's $\alpha = 0.94$). Test-retest reliability was also very good (intraclass correlation coefficient, $ICC_{2,1} = 0.96$; 95% CI = 0.86–0.99). Correlations between the Czech version of the CBI

and the Shirom–Melamed Burnout Measure were moderate to strong. The personal burnout subscale of the CBI showed a strong positive correlation with the Shirom–Melamed Burnout Measure ($r = 0.758$, $p < 0.01$). Other subscales showed similar correlations. All correlations are displayed in Table 4.

Table 4 – Correlation analysis of Copenhagen Burnout Inventory (CBI) and Shirom–Melamed Burnout Measure (SM)

Spearman's rho	CBI-personal	CBI-client related	CBI-work related	SM-total	SM-physical	SM-cognitive	SM-emotional
CBI-personal	1.0	0.594**	0.829**	0.758**	0.787**	0.591**	0.448**
CBI-client related	0.594**	1.0	0.728**	0.617**	0.596**	0.460**	0.497**
CBI-work related	0.829**	0.728**	1.0	0.810**	0.829**	0.564**	0.547**
SM-total	0.758**	0.617**	0.810**	1.0	0.882**	0.848**	0.721**
SM-physical	0.787**	0.596**	0.829**	0.882**	1.0	0.583**	0.498**
SM-cognitive	0.591**	0.460**	0.564**	0.848**	0.583**	1.0	0.570**
SM-emotional	0.448**	0.497**	0.547**	0.721**	0.498**	0.570**	1.0

Note: ** Correlation is significant at the 0.01 level (2-tailed)

DISCUSSION

Burnout syndrome is currently one of the most frequently discussed topics in the mental health field, especially in relation to professions that are exposed to long-term mental and physical stress, i.e., the helping professions. It is most studied in physicians, nurses, teachers, and social workers (Hodkinson et al., 2022; Li et al., 2024; Mincarone et al., 2024; Piperac et al., 2021), but research in the field of rehabilitation remains limited.

Our study examined the validity and reliability of the Czech version of CBI in a group of rehabilitation professionals (different specialists, from physicians to therapists and carers).

Our findings indicate very good reliability and validity of the Czech version of the CBI. The internal consistency of the Czech translation was higher than in other international studies, which reported values ranging from $\alpha = 0.85$ to $\alpha = 0.87$ (Kristensen et al., 2005).

The main aim of this study was to verify the psychometric properties of the Czech version of the CBI, rather than to examine the prevalence of burnout syndrome across different professions or healthcare fields. Our results confirm the very good reliability of the questionnaire, showing excellent internal consistency (Cronbach's $\alpha = 0.94$) and high test-retest reliability ($ICC_{2,1} = 0.96$). These values exceed the commonly accepted standards for new psychometric instruments and are comparable to (or even better than) those reported in the original validation study by the questionnaire's authors (Kristensen et al., 2005).

The validity of the instrument was further supported by moderate to strong correlations with the established Shirom–Melamed Burnout Measure, particularly for the personal burnout subscale ($r = 0.758$; $p < 0.01$). This is consistent with the hypothesized construct similarity between these scales. These findings support the applicability of the Czech version of the CBI in both clinical practice and research, especially within healthcare team settings.

Although some variability in scores between professions was observed, the data cannot be interpreted as generalizable findings for the prevalence of burnout syndrome. The sample composition was uneven, and the size of individual subgroups was too small for statistical comparisons. Therefore, data on differences between professions are presented for illustrative and indicative purposes only. Representative and larger-scale studies would be needed to properly assess differences between specific professions.

Based on the fact that a larger number of our respondents in our sample were identified as being at risk of burnout syndrome (compared with number of respondents identified with the Shirom–Melamed Burnout Measure), the CBI questionnaire may also be more sensitive for detecting risk. However, this suggestion would need to be verified on a larger sample of individuals. Nevertheless, it seems that the Czech version of the CBI questionnaire could be useful for detecting burnout risk among healthcare professionals and those in other professions.

In the Czech Republic, burnout syndrome among healthcare professionals has been most extensively studied by Ptáček et al. (2013) and Ptáček et al. (2011). They organized one of the most extensive studies to date on burnout syndrome in the Czech healthcare system; a survey conducted among physicians in 2013. Over 7,400 respondents took part, and the results showed that up to 83% of physicians reported experiencing symptoms of burnout or feeling threatened by this phenomenon. Those most at risk were early-career physicians without a stable relationship (Ptáček et al., 2013). This research was followed by studies focusing on other professional groups, such as teachers. It showed that a large proportion of them perceive their work as stressful in the long term and several of them also suffer from symptoms of depression (Ptáček et al., 2018). A later comparative study showed that a higher incidence of burnout syndrome occurs among physicians than among teachers (Ptáček et al., 2019). The working environment and conditions are key factors influencing job satisfaction and mental well-being among employees in all professions. They also play a crucial role in the development of burnout syndrome, which is particularly common among healthcare workers. For example, nurses – who are exposed to high workloads, frequent shifts, and emotionally stressful situations – have shown high levels of burnout syndrome in several studies. In the Czech Republic, research on burnout syndrome among nurses is undoubtedly more common than among members of rehabilitation teams. Still, this research usually uses the Maslach Burnout Inventory questionnaire, which limits comparability. For instance, a study among nurses working in a children's ward in Jordan reported an average CBI burnout risk score as high as 74 points (Khatatbeh et al., 2021).

The CBI questionnaire is a diagnostic test that is also used to research burnout risk in many other professions. In Denmark, the results of a comprehensive PUMA study conducted by the authors of this questionnaire were published in 2005, focusing on the incidence of burnout risk in a wide range of human service professions. The highest level of burnout was recorded among midwives (44.7 points) and home care workers in the

city (43.1 points). The highest client-related burnout was evident among prison guards (41.2 points) and midwives (38.4 points). In the PUMA study, the average score for the entire population was 35.9 points (Borritz et al., 2006), whereas the mean score in our sample was higher, at 40.9 points. Psychologists and social workers in our sample had high average burnout scores. On the other hand, physical therapists and occupational therapists had lower average scores. However, this finding should be treated with caution due to the small sample size and uneven representation of individual professions.

The uneven representation of individual healthcare professions can be considered a limitation of our study. However, individual professions are not evenly represented within multidisciplinary teams either. There is also a possible limitation in the higher representation of women in the sample, which is nevertheless typical for the helping health professions. Another limitation is that our study involved volunteers from multidisciplinary rehabilitation teams, which may introduce bias. Specifically, individuals currently more affected by this issue and at a higher risk of burnout were more likely to participate. However, the primary objective of this study was to validate the Czech version of the questionnaire, not to systematically assess the risk of burnout in the field of rehabilitation. Another limitation is the lack of a construct validity test.

We are convinced that the validation of this simple modern tool can help to more accurately assess the risk of burnout in clinical practice – and not only among healthcare professionals within the rehabilitation team.

CONCLUSION

The Czech version of the Copenhagen Burnout Inventory (CBI) appears to be a valid and reliable tool for assessing the risk of burnout in healthcare professionals. It demonstrated excellent internal consistency, and concurrent validity with the Shirom–Melamed Burnout Measure showed moderate to strong correlations. These findings are comparable with those of international studies and indicate that the Czech version of the CBI can be applied in both clinical practice and research.

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Ethical aspects and conflict of interest

The authors have no conflict of interest to declare.

REFERENCES

1. Aljabri D, Alshatti F, Alumran A, Al-Rayes S, Alsalman D, Althumairi A, et al. (2022). Sociodemographic and occupational factors associated with burnout: A study among frontline healthcare workers during the COVID-19 pandemic. *Front Public Health* 10: 854687. DOI: 10.3389/fpubh.2022.854687.
2. Bakker AB, Schaufeli WB, Demerouti E, Euwema MC (2007). An organisational and social psychological perspective on burnout and work engagement. In: Hewstone M, Schut HAW, De Wit JBF, Van Den Bos K, Stroebe MS (Eds). *The scope of social psychology: Theory and applications*. Psychology Press, pp. 227–250.
3. Borritz M, Rugulies R, Bjorner JB, Villadsen E, Mikkelsen OA, Kristensen TS (2006). Burnout among employees in human service work: design and baseline findings of the PUMA study. *Scand J Public Health* 34(1): 49–58. DOI: 10.1080/14034940510032275.
4. Eckleberry-Hunt J, Kirkpatrick H, Barbera T (2018). The problems with burnout research. *Academic Medicine* 93(3): 367–370. DOI: 10.1097/ACM.0000000000001890.
5. El-Ibiary SY, Yam L, Lee KC (2017). Assessment of burnout and associated risk factors among pharmacy practice faculty in the United States. *Am J Pharm Educ* 81(4): 75–75. DOI: 10.5688/ajpe81475.
6. Freudenberger HJ (1974). Staff burn-out. *J Soc Issues* 30(1): 159–165. DOI: 10.1111/j.1540-4560.1974.tb00706.x.
7. Grochowska A, Gawron A, Bodys-Cupak I (2022). Stress-inducing factors vs. the risk of occupational burnout in the work of nurses and paramedics. *Int J Environ Res Public Health* 19(9): 5539–5539. DOI: 10.3390/ijerph19095539.
8. Guillemin F, Bombardier C, Beaton D (1993). Cross-cultural adaptation of health-related quality of life measures: Literature review and proposed guidelines. *J Clin Epidemiol* 46(12): 1417–1432. DOI: 10.1016/0895-4356(93)90142-n.
9. Hodgkinson A, Zhou A, Johnson J, Geraghty K, Riley R, Zhou A, et al. (2022). Associations of physician burnout with career engagement and quality of patient care: systematic review and meta-analysis. *Associations of physician burnout with career engagement and quality of patient care: systematic review and meta-analysis. BMJ* 378: e070442. DOI: 10.1136/bmj-2022-070442.
10. Khatatbeh H, Pakai A, Pusztai D, Szunomár S, Fullér N, Kovács Szebeni G, et al. (2021). Burnout and patient safety: A discriminant analysis of paediatric nurses by low to high managerial support. *Nurs Open* 8(2): 982–989. DOI: 10.1002/nop2.708.
11. Kristensen TS, Borritz M, Villadsen E, Christensen KB (2005). The Copenhagen Burnout Inventory: A new tool for the assessment of burnout. *Work Stress* 19(3): 192–207. DOI: 10.1080/02678370500297720.
12. Li LZ, Yang P, Singer SJ, Pfeffer J, Mathur MB, Shanafelt T (2024). Nurse burnout and patient safety, satisfaction, and quality of care: a systematic review and meta-analysis. *JAMA Netw Open* 7(11): e2443059. DOI: 10.1001/jamanetworkopen.2024.43059.
13. Malach-Pines A (2005). The Burnout Measure, Short Version. *Int J Stress Manag* 12(1): 78–88. DOI: 10.1037/1072-5245.12.1.78.
14. Maroon I (2021). Burnout bei Sozialarbeitern: Theorie und Interventionsperspektiven. Georg Olms Verlag, 208 p.

15. Maslach C, Jackson SE (1981). The measurement of experienced burnout. *J Org Behav* 2(2): 99–113. DOI: 10.1002/job.4030020205.
16. Maslach C, Jackson SE, Leiter MP (1997). Maslach Burnout Inventory: 3rd ed. In: Zalaquett CP, Wood RJ (Eds). *Evaluating stress: A book of resources*. Scarecrow Education, pp. 191–218.
17. Maslach C, Schaufeli WB, Leiter MP (2001). Job burnout. *Annu Rev Psychol* 52: 397–422. DOI: 10.1146/annurev.psych.52.1.397.
18. Mincarone P, Bodini A, Tumolo MR, Sabina S, Colella R, Mannini L, et al. (2024). Association between physical activity and the risk of burnout in health care workers: systematic review. *JMIR Public Health Surveill* 10: e49772. DOI: 10.2196/preprints.49772.
19. Pawłowicz-Szłarska E, Skrzypczyk P, Stańczyk M, Pańczyk-Tomaszewska M, Nowicki M (2022). Burnout syndrome among pediatric nephrologists – report on its prevalence, severity, and predisposing factors. *Medicina* 58(3): 446. DOI: 10.3390/medicina58030446.
20. Piperac P, Todorovic J, Terzic-Supic Z, Maksimovic A, Karic S, Pilipovic F, Soldatovic I (2021). The validity and reliability of the Copenhagen burnout inventory for examination of burnout among preschool teachers in Serbia. *Int J Environ Res Public Health* 18(13): 6805. DOI: 10.3390/ijerph18136805.
21. Poschkamp T (2011). *Ausgebrannt! Burnout Erkennen, Heilen, Verhindern*. Brill Schoningh, 100 p. (pp. 11–14).
22. Ptáček R, Čeledová L, et al. (2011). *Stres a syndrom vyhoření u lékařů posudkové služby*. Praha: Karolinum, 118 p.
23. Ptáček R, Raboch J, Kebza V, et al. (2013). *Burnout syndrom jako mezioborový jev*. Edice celoživotního vzdělávání ČLK. Praha: Grada, 168 p.
24. Ptáček R, Raboch J, Kebza V, Šolcová I, Vňuková M, Hlinka J, et al. (2017). Czech version of the Shirom melamed burnout measure. *Cesk Psychol* 61(6): 536–545.
25. Ptáček R, Vňuková M, Raboch J, Smetáčková I, Harsa P, Švandová L (2018). Syndrom vyhoření a životní styl učitelů českých základních škol. *Ceska Slov Psychiatr* 114(5): 199–204.
26. Ptáček R, Vňuková M, Smetáčková I, Weissenberger S, Harsa P, Raboch J (2019). Who burns out more? Comparison of burnout levels between teachers and physicians in the Czech Republic. *Act Nerv Super* 61: 165–169. DOI: 10.1007/s41470-019-00034-3.
27. Shirom A, Melamed S (2006). A comparison of the construct validity of two burnout measures in two groups of professionals. *Int J Stress Manag* 13(2): 176–200. DOI: 10.1037/1072-5245.13.2.17.
28. Shoman Y, Hostettler R, Guseva Canu I (2023). Psychometric validity of the Shirom–Melamed Burnout Measure and the Burnout Assessment Tool: a systematic review. *Arh Hig Rada Toksikol* 74(4): 238–244. DOI: 10.2478/aiht-2023-74-3769.
29. Stock C (2015). *Burnout: Erkennen und verhindern* (Vol. 206). Haufe TaschenGuide 206, 129 p.
30. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, et al. (2007). Quality criteria were proposed for measurement properties of health status questionnaires. *J Clin Epidemiol* 60(1): 34–42. DOI: 10.1016/j.jclinepi.2006.03.012.

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