

Original Article

BURNOUT-RELATED EXPERIENCES, WORKPLACE SUPPORT AND PREVENTION NEEDS AMONG INTENSIVE CARE NURSES: A CROSS-SECTIONAL STUDY

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Key Messages:

1. ICU nurses frequently report exhaustion and work-life interference.
2. Psychological support is commonly perceived as inadequate.
3. Nurses strongly support organisational prevention measures.

Abstract

Background: Intensive care nurses face sustained emotional, cognitive, and organisational demands that may contribute to burnout-related symptoms and staff turnover.

Aim: To examine self-reported burnout-related experiences, perceived psychological support in the workplace, prevention needs, and sociodemographic differences among nurses with intensive care unit (ICU) experience.

Materials and Methods: A quantitative cross-sectional online survey was conducted from 12 March to 20 June 2025. A total of 185 questionnaires were received; four respondents were excluded because they did not meet the ICU-experience eligibility criterion, resulting in an eligible analytical sample of 181 participants. A study-specific 21-item questionnaire was used. Item-level descriptive statistics with 95% confidence intervals (CIs), Spearman rank correlations, Mann-Whitney U tests, and Kruskal-Wallis tests were applied.

Results: Emotional exhaustion after a shift was reported often or very often by 76.5% of respondents (95% CI, 69.8–82.1). Other frequent experiences included reduced motivation (50.3%), exhaustion outside work (59.1%), considering a job change (55.2%), feeling undervalued (59.7%), and work-life interference (59.1%); 61.3% reported a high perceived impact of ICU conditions on mental health. Psychological support was rated as inadequate by 94.5% (95% CI, 90.1–97.0), 96.7% considered organisational

measures necessary, and 63.1% would participate in a prevention programme. Three of 70 subgroup comparisons remained statistically significant after Benjamini–Hochberg adjustment.

Conclusion: Frequent exhaustion, reduced motivation, work–life interference, perceived undervaluation, and unmet support needs indicate substantial occupational strain among nurses with ICU experience. The findings are item-specific and should not be interpreted as a diagnostic classification or as an estimate of burnout prevalence.

Keywords: burnout; nurses; criticalcare

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Introduction

Burnout is an occupational phenomenon characterised by exhaustion, increased mental distance from work or cynicism, and reduced professional efficacy; it is not a medical diagnosis.¹ Individual experiences associated with burnout should therefore be distinguished from the measurement of the full multidimensional construct.

Intensive care nurses manage patients with high acuity, continuous surveillance, resuscitation, and end-of-life care. Alarm overload and demanding working conditions contribute to occupational strain.^{2,3} Coping with patient death also has implications for professional well-being and the need for support.⁴

Burnout among ICU nurses is associated with lower job satisfaction, turnover intention, and work-related stress.^{5–7} Organisational support and leadership may influence these relationships.^{8,9} Discussions of the nursing workforce likewise emphasise safe practice environments, education, and professional development.¹⁰

Croatian research has documented burnout among critical care nurses, while European initiatives have examined education and healthy work environments.^{11,12} Recent Croatian studies have identified opportunities to improve work-environment standards and reported associations with retention-related outcomes.^{13,14} Further descriptive evidence on nurses' experiences and perceived support needs can help inform local priorities.

This study examined burnout-related experiences, perceived psychological support, and prevention needs among nurses with current or

previous ICU experience. It explored associations between individual items and differences according to sex, age, ICU experience, current ICU employment, and shift pattern. No composite burnout score was constructed.

Materials and Methods

Study design and participants

An anonymous cross-sectional online survey was conducted in Croatia from 12 March to 20 June 2025. Eligible participants were nurses and nursing technicians currently working in an ICU or with previous ICU experience. Completion took approximately 10–15 minutes. Of the 185 questionnaires received, four respondents reported never having worked in an ICU and were excluded. All analyses, including Table 1, concern the 181 eligible respondents. The study size was determined by the eligible responses received during this recruitment period.

Convenience sampling with voluntary self-selection was used. The invitation and survey link were distributed electronically through General Hospital Šibenik. The link was openly accessible to recipients and to people to whom it was forwarded. The number of eligible nurses who received or viewed the invitation was unknown, preventing calculation of a response rate. No incentives were offered.

Instrument

The questionnaire contained 21 items, including one free-text question on ICU type. Six items described sociodemographic and occupational characteristics; 15 addressed exhaustion, emotional regulation, motivation, detachment,

workplace relationships, work–life interference, perceived mental health impact, and support and prevention needs.

The authors developed the questionnaire based on literature reviewed during study preparation. Content selection addressed the descriptive study objectives rather than following a formal theory-based instrument-development framework. Items were written in Croatian and were not adopted or adapted from a validated instrument. No formal expert-panel assessment of content validity, pilot testing for clarity, or psychometric validation was conducted before data collection. The questionnaire is a study-specific descriptive survey, not a validated multidimensional burnout measure. No total score, diagnostic cut-off, or burnout prevalence estimate was derived. Supplementary Material S1 provides the Croatian wording, English translation, response options, and analytical mapping.

Fourteen items used five-point ordinal response scales. Frequency anchors ranged from never to very often; emotional stability ranged from very stable to very unstable. Other anchors described perceived impact, support adequacy, expected educational benefit, and the need for organisational measures. Willingness to join a prevention programme (yes/no/maybe) was treated as a nominal variable and analysed descriptively only.

Statistical analysis

Analyses were verified in Python using SciPy 1.17.0. Ordinal items were summarised using medians and first and third quartiles, calculated by linear interpolation without rounding to whole response categories. Principal proportions are presented with Wilson 95% confidence intervals (CIs). Upper response categories were combined for descriptive reporting, not as validated clinical thresholds.

Two-sided Mann–Whitney U tests used asymptotic, tie-corrected p-values with continuity correction; Kruskal–Wallis tests were used for comparisons involving more than two groups. Effect sizes were calculated as $|Z|/\sqrt{N}$ and $\epsilon^2 = (H - k + 1)/(N - k)$, respectively, where N is the

valid sample size and k is the number of groups. Benjamini–Hochberg adjustment was applied to all 70 comparisons (14 items $\times$ five grouping variables), with $q < 0.05$ defining statistical significance after adjustment. No post-hoc pairwise tests or multivariable adjustment were performed. All subgroup analyses were exploratory.

All 91 unique Spearman correlations between the 14 ordinal items were exploratory and uncorrected for multiplicity, using pairwise valid observations. For concise reporting, five correlations were selected post hoc: the three largest absolute coefficients overall and the strongest association involving each of psychological support and the need for organisational measures. These selections describe co-occurrence and do not establish causal relationships.

Eligibility was determined by the current-employment question, which included the response option “No, I have never worked in an ICU”; the experience-duration question lacked an equivalent option. Multiple selections on items intended to allow a single response were treated as missing for that item. There were no blank responses among eligible respondents. Multiple selections occurred on items 7 ($n = 2$), 9 ($n = 7$), 19 ($n = 2$), 20 ($n = 2$), and 21 ($n = 1$), yielding valid denominators of 174–181; no imputation was used. Five respondents selecting both shift patterns were retained for descriptive analyses but excluded from shift comparisons. Personal identifiers were unavailable for checking for duplicate participation.

During revision, free-text ICU types were recoded using explicit rules: spelling and capitalisation variants were normalised; identifiable unit types were assigned to general, cardiology/coronary, neurology/neurosurgical, surgical, or paediatric/neonatal categories; other specialties, multiple-unit reports, and ambiguous labels formed a residual category. The complete mapping is provided in S1. No independent clinical adjudication was undertaken.

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vided in S1. No independent clinical adjudication was undertaken.

Ethical considerations

The Ethics Committee of General Hospital Šibenik approved the study before recruitment (2182-1-50-11-25-2; 4 March 2025). The survey introduction described the research purpose, anonymity, and consent statement; submission indicated consent to participate. No directly identifying information was collected. The study followed the Declaration of Helsinki¹⁵ and is reported with reference to STROBE guidance.¹⁶

Results

Participant characteristics

Among 181 eligible respondents, 160 (88.4%) were women, 113 (62.4%) were aged 18–35 years, 86 (47.5%) had no more than five years of ICU experience, and 129 (71.3%) currently worked in an ICU. Rotating shifts alone were reported by 147 (81.2%). General ICU was the largest recoded unit category (85/181, 47.0%; Table 1).

Table 1. Participant characteristics of the eligible analytical sample ($n = 181$).

Characteristic	n	%
Sex		
Women	160	88.4
Men	21	11.6
Age, years		
18–25	35	19.3
26–35	78	43.1
36–45	38	21.0
46–55	25	13.8
≥56	5	2.8
ICU experience		
<1 year	23	12.7
1–5 years	63	34.8
6–10 years	43	23.8
11–20 years	28	15.5
>20 years	24	13.3

Characteristic	n	%
ICU type		
General ICU	85	47.0
Cardiology/coronary ICU	22	12.2
Neurology/neurosurgical ICU	20	11.0
Surgical ICU	21	11.6
Paediatric/neonatal ICU	9	5.0
Other, multiple or unspecified	24	13.3
Currently employed in an ICU		
Yes	129	71.3
No	52	28.7
Shift pattern		
Morning only	29	16.0
Rotating day–night	147	81.2
Both patterns	5	2.8

Burnout-related experiences

Item-specific valid denominators and the proportions selecting upper response categories are presented in Table 2.

Emotional exhaustion after a shift was reported often or very often by 76.5% (95% CI 69.8–82.1).

Reduced motivation was reported by 50.3% (43.1–57.5), exhaustion outside work by 59.1% (51.8–66.0), and job-change thoughts by 55.2% (48.0–62.3). Working without emotional connection was reported by 40.3% (33.5–47.6). Emotional stability was rated unstable or very unstable by 8.6% (5.3–13.7).

Table 2. Item-level burnout-related symptoms and work experiences among the eligible analytical sample (n = 181).

Item	Valid n	Median (Q1–Q3)	Score 4–5, n (%) [95% CI]
Emotional exhaustion after a shift	179	4 (4–5)	137 (76.5) [69.8–82.1]
Difficulty maintaining emotional balance	181	3 (3–4)	82 (45.3) [38.2–52.6]
Emotional instability under stress	174	2 (2–3)	15 (8.6) [5.3–13.7]
Reduced motivation for work	181	4 (3–4)	91 (50.3) [43.1–57.5]
Exhausted even when away from work	181	4 (3–4)	107 (59.1) [51.8–66.0]
Considering a job change due to exhaustion	181	4 (3–5)	100 (55.2) [48.0–62.3]
Working automatically, without emotional connection	181	3 (3–4)	73 (40.3) [33.5–47.6]
Conflict with colleagues or supervisors	181	2 (2–3)	23 (12.7) [8.6–18.3]
Feeling undervalued by supervisors	181	4 (3–5)	108 (59.7) [52.4–66.5]
Work stress disrupts work–life balance	181	4 (3–5)	107 (59.1) [51.8–66.0]
Perceived impact of ICU conditions on mental health	181	4 (3–4)	111 (61.3) [54.1–68.1]

Note. Values are median (Q1–Q3). Scores 4–5 combine often/very often, unstable/very unstable, or large/very large perceived impact, as applicable. These are descriptive categories, not clinical thresholds. Percentages and Wilson 95% CI use item-specific valid denominators.

Workplace support and prevention needs

Workplace psychological support was rated “not at all” or “poor” by 94.5% (95% CI 90.1–97.0). A large or very large expected improvement from education was reported by 40.8% (33.9–48.1), and 96.7% (92.9–98.5) considered organisational measures fairly or very necessary. Among 179 valid responses on programme participation, 113 (63.1%; 55.9–69.9) answered yes, 61 (34.1%) maybe and five (2.8%) no (Table 3).

Table 3. Workplace support and prevention needs among the eligible analytical sample (n = 181).

Measure	Valid n	Median (Q1–Q3)	Reported category	n (%) [95% CI]
Workplace psychological support	181	1 (1–2)	Not at all/poor	171 (94.5) [90.1–97.0]
Expected benefit of additional education	179	3 (2–4)	A lot/very much	73 (40.8) [33.9–48.1]
Need for special organisational measures	180	5 (5–5)	Fairly/very much needed	174 (96.7) [92.9–98.5]
Willingness to join a prevention programme	179	—	Yes	113 (63.1) [55.9–69.9]

Associations and subgroup differences

The five selected exploratory correlations were positive for work–life interference with perceived mental-health impact ($\rho = 0.660$), reduced motivation with job-change thoughts ($\rho = 0.651$), emotional exhaustion with perceived mental-health impact ($\rho = 0.595$), and need for organisational measures with work–life interference ($\rho = 0.321$). Psychological support was inversely associated with feeling undervalued ($\rho = -0.303$). All five unadjusted p-values were <0.001 ; these selected associations were not corrected for the 91 tests.

Twelve of 70 subgroup comparisons had unadjusted $p < 0.05$ (Tables 4–5). Three remained significant after BH adjustment: perceived mental-health impact by ICU experience ($\epsilon^2 = 0.126$, $q = 0.002$), job-change thoughts by sex ($r = 0.24$, $q = 0.041$), and feeling undervalued by age ($\epsilon^2 = 0.074$, $q = 0.045$). The remaining 58 comparisons had unadjusted $p \geq 0.05$. Differences involving shift pattern, current ICU employment and other age/experience outcomes did not survive adjustment. Omnibus findings do not establish differences between specific age or experience categories.

Table 4. Two-group differences in item responses reaching $p < 0.05$ in unadjusted analyses.

Group	Outcome	Median (Q1–Q3); n	U	p / q	Effect
Sex	Emotional balance difficulty	Women: 3 (3–4); 160 Men: 3 (3–4); 21	2098.0	0.047 / 0.261	$r = 0.15$
Sex	Job-change thoughts	Women: 4 (3–5); 160 Men: 3 (2–3); 21	2383.5	0.001 / 0.041	$r = 0.24$
Shift pattern	Feeling undervalued	Rotating: 4 (3–5); 147 Morning: 4 (2–4); 29	2614.0	0.046 / 0.261	$r = 0.15$
Shift pattern	Expected benefit of education	Rotating: 3 (2–4); 146 Morning: 4 (2.75–4); 28	1440.0	0.011 / 0.122	$r = 0.19$
Current ICU work	Need for organisational measures	Current: 5 (5–5); 128 Former: 5 (4–5); 52	3755.0	0.045 / 0.261	$r = 0.15$

Note. All comparisons with unadjusted $p < 0.05$ are shown across Tables 4–5. q denotes BH-adjusted p across all 70 tests. $r = |Z|/\sqrt{N}$. Values are median (Q1–Q3); N excludes invalid item responses. Five respondents selecting both shift patterns were excluded from shift comparisons.

Table 5. Multigroup differences in item responses reaching $p < 0.05$ in unadjusted analyses.

Group	Outcome	Median (Q1–Q3); n	H	p / q	Effect
Age	Feeling undervalued	18–25: 4 (3.5–5); 35 26–35: 4 (3–5); 78 36–45: 4 (3–4); 38 46–55: 3 (2–4); 25 ≥56: 3 (3–5); 5	17.02	0.002 / 0.045	$\epsilon^2 = 0.074$
ICU years	Emotional exhaustion after a shift	<1 y: 4 (3–4); 23 1–5 y: 4 (4–5); 62 6–10 y: 4 (3.5–4); 43 11–20 y: 4 (4–5); 27 >20 y: 4 (3.75–4.25); 24	9.68	0.046 / 0.261	$\epsilon^2 = 0.033$
ICU years	Exhaustion outside work	<1 y: 3 (3–4); 23 1–5 y: 4 (3–5); 63 6–10 y: 4 (3–4); 43 11–20 y: 4 (3–5); 28 >20 y: 3 (3–4.25); 24	10.07	0.039 / 0.261	$\epsilon^2 = 0.034$
ICU years	Work–life interference	<1 y: 3 (2.5–4); 23 1–5 y: 4 (3–4.5); 63 6–10 y: 4 (3–5); 43 11–20 y: 4 (3–5); 28 >20 y: 3 (2.75–4); 24	14.74	0.005 / 0.092	$\epsilon^2 = 0.061$
ICU years	Perceived mental-health impact	<1 y: 3 (2.5–3); 23 1–5 y: 4 (3.5–5); 63 6–10 y: 4 (3–4); 43 11–20 y: 4 (3–5); 28 >20 y: 3.5 (3–4); 24	26.22	<0.001 / 0.002	$\epsilon^2 = 0.126$
Age	Need for organisational measures	18–25: 5 (5–5); 34 26–35: 5 (5–5); 78 36–45: 5 (5–5); 38 46–55: 5 (4–5); 25 ≥56: 5 (5–5); 5	12.81	0.012 / 0.122	$\epsilon^2 = 0.050$
ICU years	Need for organisational measures	<1 y: 5 (4–5); 23 1–5 y: 5 (5–5); 62 6–10 y: 5 (5–5); 43 11–20 y: 5 (5–5); 28 >20 y: 5 (4–5); 24	13.18	0.010 / 0.122	$\epsilon^2 = 0.052$

Note. q denotes BH-adjusted p across all 70 comparisons; $\epsilon^2 = (H - k + 1)/(N - k)$. Values are median (Q1–Q3), with linearly interpolated quartiles retained. No post-hoc pairwise tests were performed.

Discussion

This survey identified frequent exhaustion, reduced motivation, work-life interference, perceived undervaluation, and unmet support needs among nurses with ICU experience. These findings describe individual experiences and perceptions; they do not establish burnout prevalence or a validated multidimensional syndrome.

The exhaustion and job-change findings are consistent with evidence linking burnout, job satisfaction, and turnover intention in critical care nursing.^{5, 6} However, the present cross-sectional data cannot establish whether exhaustion precedes thoughts of leaving the job or whether working conditions influence both.

Perceived psychological support was particularly limited. Previous studies have associated organisational support with burnout and have emphasised leadership, communication, and staffing.^{8, 11} Croatian work-environment studies have similarly identified opportunities for improvement.^{13, 14} The present responses indicate perceived unmet needs, not the effectiveness of specific psychological services.

Interest in prevention was substantial, but willingness to participate is distinct from actual uptake or benefit. A review of mindfulness-based interventions suggests potential benefits while noting variation in programme design and context.¹⁷ Conversely, a Croatian survey of physiotherapists found no statistically significant association between physical activity and burnout ($p = 0.255$).¹⁸ Neither finding establishes what would be effective for this ICU sample, and no intervention was tested in the present study.

Only three subgroup comparisons remained statistically significant after adjustment for multiplicity. The male subgroup ($n = 21$) and the oldest age category ($n = 5$) were small, limiting precision. Age, sex, ICU experience, shift pattern, and current employment may be interrelated; the univariable comparisons did not adjust for these potential confounders. Even the adjusted findings therefore remain exploratory associations.

The ICU-experience and age findings are omnibus results. Without post-hoc testing, individual

categories cannot be identified as differing statistically from one another. Differences in responsibility, cumulative exposure, or retention could be investigated in future studies but were not measured here.

The selected correlations suggest co-occurrence of exhaustion, reduced motivation, and work-life interference. Selection was post hoc, and no correlation-level multiplicity correction was applied. These patterns are hypothesis-generating; an association between perceived need for organisational measures and adverse experiences does not demonstrate that introducing such a measure would reduce them.

Feeling undervalued varied by age after adjustment. Generational differences in stress and coping have been examined elsewhere,¹⁹ but this study did not measure the mechanisms underlying the age association. The shift-pattern difference in perceived undervaluation did not survive adjustment and should not be treated as established.

Patient outcomes were not measured, and the findings permit no inference about care safety. Longitudinal research linking validated staff measures with staffing, missed care, and patient experience would better inform organisational decisions.

Strengths and limitations

Convenience recruitment and online self-selection limit representativeness and may favour nurses with strong views. The invitation denominator was unknown, preventing assessment of the response rate and non-response bias. Data were self-reported and cross-sectional, with potential recall and social-desirability bias. Current and former ICU staff were combined, and the questionnaire did not specify a uniform recall period. It was not piloted or validated; the introductory wording may also have influenced responses. The items represent distinct experiences rather than validated subscales. Invalid multiple responses reduced some denominators. Duplicate participation could not be verified in the absence of personal identifiers. Unit-type

recoding was transparent but lacked independent clinical adjudication. Correlations were exploratory, uncorrected for multiplicity, and selectively reported; subgroup comparisons were adjusted for multiplicity but not for confounding. Future studies should use validated Croatian measures, explicit sampling and recall periods, prespecified outcomes, and multivariable analyses.

Implications for nursing management

Together with existing evidence, the findings support consideration of confidential assessment using validated instruments, review of staffing and recovery time, predictable schedules, supportive leadership, mentorship, and accessible psychological support. These should be regarded as priorities for evaluation rather than intervention effects demonstrated by this survey.

Conclusion

Nurses with ICU experience frequently reported exhaustion, reduced motivation, work–life interference, and thoughts of changing jobs, alongside perceived inadequate support and strong interest in organisational measures. Interpretation should remain at the item level. Multicentre longitudinal studies using validated measures are needed to evaluate prevention strategies.

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Declarations

Ethics approval and consent to participate: The study was approved by the Ethics Committee of Šibenik General Hospital (approval number 2182-1-50-11-25-2, dated 4 March 2025). Participation was voluntary and anonymous; informed consent was provided electronically.

Funding: No external funding was reported.

Conflict of interest: The authors declare no conflict of interest.

Data availability: The anonymised dataset generated and analysed during the present study is available from the corresponding author on reasonable request.

Author contributions: All authors made substantial contributions to the work reported. Ivona Dželalija Bura: conception and design of the study, data collection, analysis and interpretation of data, and drafting of the manuscript. Biljana Filipović, Sandra Bošković, and Adriano Friganović: conception and design of the study, interpretation of data, and critical revision of the manuscript for important intellectual content. All authors read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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SUPPLEMENTARY MATERIAL

S1. Study questionnaire (English translation and original Croatian wording)

Manuscript: Burnout-Related Experiences, Workplace Support and Prevention Needs Among Intensive Care Nurses: A Cross-Sectional Study

The authors developed this study-specific questionnaire from literature reviewed during study preparation. It was administered in Croatian. Items describe individual experiences, perceptions and prevention needs; they do not constitute validated burnout subscales.

The English translation is presented alongside the Croatian wording. Item formats and invalid responses were checked against the exported response data. Multiple selections were present on items 7, 9, 19, 20 and 21; each such response was excluded only from the corresponding item analysis. The original questionnaire's thematic headings and introductory statements are reproduced for transparency, not as evidence of validated subscales. The supplementary section headings are editorial descriptions.

Introductory text and statement of consent

Dear colleague,

Thank you for taking the time to participate in this survey on burnout syndrome among nurses in intensive care units. Your dedication, expertise and daily commitment to work in intensive care units require not only a high professional standard but also exceptional emotional resilience, which very often leads to emotional, physical and psychological exhaustion. This questionnaire seeks to collect your experiences and feelings so that we may better understand the scope of burnout syndrome, its influence on you as a professional and the way in which you face the challenges of your working environment.

Your honest answers will help us to develop strategies for improving working conditions, mutual support and the prevention of burnout.

The survey is anonymous and all data will be used exclusively for research purposes.

We sincerely thank you for your participation and your contribution to this research, because your answers are essential for the further improvement of our working conditions.

At the end of this introduction, we ask you to accept the statement that constitutes your formal consent to participate in the research: By this means I consent to participate in this research and confirm that I am acquainted with its purpose, the manner of its conduct and the manner in which the collected data will be used, and that I have no objection.

When answering the questions, you are expected to select one of the offered options.

Thank you for your cooperation.

Poštovani/Poštovana, Zahvaljujemo Vam što ste odvojili vrijeme za sudjelovanje u ovoj anketi o sindromu sagorijevanja među medicinskim sestrama u jedinicama intenzivnog liječenja. Vaša predanost, stručnost i svakodnevna posvećenost radu u jedinicama intenzivnog liječenja zahtijevaju ne samo visok profesionalni standard, već i iznimnu emocionalnu otpornost, što vrlo često dovodi do emocionalne, fizičke i psihičke iscrpljenosti. Ovaj anketni upitnik nastoji prikupiti Vaša iskustva i osjeća je kako bismo bolje razumjeli opseg sindroma sagorijevanja, njegov utjecaj na Vas kao profesionalce i kako se suočavate s izazovima u svom radnom okruženju. Vaši iskreni odgovori pomoći će nam u razvijanju strategija za unapređenje radnih uvjeta, bolje međusobne podrške i prevencije sagorijevanja. Anketa je anonimna, a svi podaci će biti korišteni isključivo za istraživačke svrhe. Srdačno zahvaljujemo na Vašem sudjelovanju i doprinosu ovom istraživanju, jer Vaši odgovori su ključni za daljnje unapređenje naših radnih uvjeta. Na kraju ovog uvodnog obraćanja, molimo Vas da uvažite izjavu koja predstavlja Vaš službeni pristanak za istraživanje: Ovim putem pristajem na sudjelovanje u ovom istraživanju i potvrđujem da sam upoznat/a sa njegovom svrhom, načinom

provedbe i načinom korištenja prikupljenih podataka te da nemam primjedbi. Prilikom odgovaranja na pitanja, očekuje se odabir jedne od ponuđenih opcija. Hvala Vam na suradnji! S poštovanjem!

Section A. Sociodemographic and occupational characteristics (items 1-6)

1. Sex

Spol:

Response format: check box (multiple selection technically possible)

- Male — *Muško*
- Female — *Žensko*

2. Age group

Dobna skupina:

Response format: check box (multiple selection technically possible)

- 18-25 — *18-25*
- 26-35 — *26-35*
- 36-45 — *36-45*
- 46-55 — *46-55*
- 56+ — *56+*

3. Work experience in intensive care units (include previous experience if you worked in an ICU earlier, even if you do not work there now)

Radno iskustvo u jedinicama intenzivnog liječenja: (Uključite i prethodno iskustvo ako ste radili u JIL-u ranije, čak i ako trenutno ne radite.)

Response format: check box (multiple selection technically possible)

- <1 year — *<1 godina*
- 1-5 years — *1-5*
- 6-10 years — *6-10*
- 11-20 years — *11-20*
- >20 years — *>20*

4. Please write the specialised intensive care unit in which you work or have worked (general ICU, cardiac, neurological, NICU, etc.)

Molimo, napišite specijaliziranu jedinicu intenzivnog liječenja u kojoj radite ili ste radili (Opći JIL, Kardiološki, Neurološki, NICU, itd.):

Response format: free text

5. Are you currently employed in one of the intensive care units?

Jeste li trenutno zaposleni u nekoj od jedinica intenzivnog liječenja:

Response format: check box (multiple selection technically possible)

- Yes — *Da*
- No — *Ne*
- No, I have never worked in an ICU — *Ne, nikad nisam radio/la u JIL-u*

6. Working hours

Radno vrijeme:

Response format: check box (multiple selection technically possible)

- Morning shifts — *Jutarnje smjene*
- Day-night (rotating) shifts — *Dnevne-noćne smjene*

Section B. Emotional exhaustion and emotional regulation (items 7-12)

Introductory text displayed before item 7: The following is a questionnaire on emotional exhaustion, which arises when there is overload, stress and an inability to recover emotionally from work with patients. Emotional exhaustion can lead to reduced empathy and reduced job satisfaction.

U nastavku slijedi anketni upitnik o emocionalnoj iscrpljenosti koji se javlja kada postoji preopterećenost, stres i nemogućnost emocionalnog oporavka od rada s pacijentima. Emocionalna iscrpljenost može dovesti do smanjene empatije i smanjenog zadovoljstva poslom.

7. How often do you feel emotionally exhausted after a shift? (1 = never, 5 = very

often). Please mark the number that best describes how often you feel emotionally exhausted after shifts.

*Koliko često osjećate emocionalnu iscrpljenost nakon smjene? (1-Nikada, 5-Veoma često)
Molimo Vas da označite broj koji najbolje opisuje koliko često osjećate emocionalnu iscrpljenost nakon smjena.*

Response format: check box (multiple selection technically possible)

- 1 - Never — 1-Nikada
- 2 - Rarely — 2-Rijetko
- 3 - Sometimes — 3-Ponekad
- 4 - Often — 4-Često
- 5 - Very often — 5-Veoma često

8. Do you feel that it is difficult to maintain emotional balance when facing difficult situations and patients in the intensive care unit? (1 = never, 5 = very often). Please rate how often you experience difficulty in maintaining emotional balance in challenging situations with patients.

Osjećate li da je teško održati emocionalnu ravnotežu u suočavanju s teškim situacijama i pacijentima u jedinici intenzivnog liječenja? (1-Nikada, 5-Veoma često) Molimo Vas da ocijenite koliko često osjećate teškoću u održavanju emocionalne ravnoteže u izazovnim situacijama s pacijentima.

Response format: check box (multiple selection technically possible)

- 1 - Never — 1-Nikada
- 2 - Rarely — 2-Rijetko
- 3 - Sometimes — 3-Ponekad
- 4 - Often — 4-Često
- 5 - Very often — 5-Veoma često

9. How would you rate your ability to remain emotionally stable and to retain control over your own emotions despite the stress your work involves? (1 = very stable, 5 = very unstable). Please rate your ability to preserve emotional stability in work with patients, even when the work is very stressful.

Kako biste ocijenili svoju sposobnost da ostanete emocionalno stabilni i zadržite kontrolu nad vlastitim emocijama, unatoč stresu koji donosi Vaš posao? (1-Veoma stabilan, 5-Veoma nestabilan) Molimo Vas da ocijenite svoju sposobnost očuvanja emocionalne stabilnosti u radu s pacijentima, čak i kad je posao vrlo stresan.

Response format: check box (multiple selection technically possible)

- 1 - Very stable — 1-Veoma stabilno
- 2 - Stable — 2-Stabilno
- 3 - Sometimes stable — 3-Ponekad stabilno
- 4 - Unstable — 4-Nestabilno
- 5 - Very unstable — 5-Veoma nestabilno

10. Do you feel that your motivation for work is decreasing? (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often)

Osjećate li da se Vaša motivacija za rad smanjuje? (1-Nikad, 2-Rijetko, 3-Ponekad, 4-Često, 5-Veoma često)

Response format: single choice, 1-5 scale

11. Do you feel exhausted and overtired even when you are not at work? (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often)

Osjećate li se iscrpljeno i premoreno čak i kada niste na poslu? (1-Nikada, 2-Rijetko, 3-Ponekad, 4-Često, 5-Veoma često)

Response format: single choice, 1-5 scale

12. How often do you think about changing your workplace because of exhaustion? (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often)

Koliko često razmišljate o promjeni radnog mjesta zbog iscrpljenosti? (1-Nikada, 2-Rijetko, 3-Ponekad, 4-Često, 5-Veoma često)

Response format: single choice, 1-5 scale

Section C. Detachment, motivation and work-related functioning (items 13-17)

Introductory text displayed before item 13: In this part of the questionnaire we explore aspects of depersonalisation, which include emotional distancing, a reduction in compassion and the appearance of negative feelings towards the patient or towards colleagues. Constant exposure to stress and emotional exhaustion may affect your ability to connect with the patient and reduces the quality of the support and care provided.

U ovom dijelu anketnog upitnika istražujemo aspekte depersonalizacije, što uključuje emocionalno distanciranje, smanjenje suosjećanja te pojavnost negativnih osjećaja prema pacijentu ili kolegama. Konstantna izloženost stresu i emocionalna iscrpljenost, mogu utjecati na Vašu sposobnost povezivanja sa pacijentom te smanjuje kvalitetu pružanja podrške i skrbi za pacijenta.

13. How often do you feel as though you work „automatically” and without an emotional connection to patients? (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often)

Koliko često se osjećate kao da radite „automatski” i bez emotivnog povezivanja s pacijentima? (1-Nikada, 2-Rijetko, 3-Ponekad, 4-Često, 5-Veoma često)

Response format: single choice, 1-5 scale

14. How often do you experience conflicts with colleagues or supervisors at work? (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often)

Koliko često doživljavate konflikte s kolegama ili nadređenima na poslu? (1-Nikada, 2-Rijetko, 3-Ponekad, 4-Često, 5-Veoma često)

Response format: single choice, 1-5 scale

15. Do you feel insufficiently valued by your supervisors? (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often)

Osjećate li se nedovoljno cijenjeni od strane nadređenih? (1-Nikada, 2-Rijetko, 3-Ponekad, 4-često, 5-Veoma često)

Response format: single choice, 1-5 scale

16. How often do you feel that stress at work affects the balance between your private and professional life? (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often)

Koliko često osjećate da Vam stres na poslu utječe na ravnotežu između privatnog i profesionalnog života? (N1-Nikada, 2-Rijetko, 3-Ponekad, 4-Često, 5-Veoma često)

Response format: single choice, 1-5 scale

17. Do you consider that working conditions in the ICU have an impact on your mental health?

Smatrate li da uvjeti rada u JIL-u imaju utjecaj na Vaše mentalno zdravlje?

Response format: check box (multiple selection technically possible)

- No impact — *Nema utjecaja*
- Small impact — *Mali utjecaj*
- Moderate impact — *Umjeren utjecaj*
- Large impact — *Veliki utjecaj*
- Very large impact — *Veoma veliki utjecaj*

Section D. Perceived workplace support and prevention needs (items 18-21)

Introductory text displayed before item 18:
In this part of the survey we explore your perception of the existing forms of support at the workplace and of the possibilities for preventing burnout syndrome.

U ovom dijelu ankete istražujemo Vašu percepciju o postojećim oblicima podrške na radnom mjestu i mogućnostima za prevenciju sindroma sagorijevanja.

18. Do you consider that adequate psychological support exists at your workplace? (1 = not at all, 5 = adequate)

Smatrate li da postoji adekvatna psihološka podrška na radnom mjestu? (1-Nikako, 5-Adekvatno)

Response format: check box (multiple selection technically possible)

- 1 - Not at all — 1-Nikako
- 2 - Poor — 2-Slabo
- 3 - Moderate — 3-Umjereno
- 4 - Sufficient — 4-Dovoljno
- 5 - Adequate — 5-Adekvatno

19. Do you consider that additional education about stress and burnout syndrome would improve working conditions? (1 = not at all, 5 = would improve greatly)

Smatrate li da bi dodatna edukacija o stresu i sindromu sagorijevanja poboljšala radne uvjete? (1-Nikako, 5-Puno bi poboljšalo)

Response format: check box (multiple selection technically possible)

- 1 - Not at all — 1-Nikako
- 2 - Would improve slightly — 2-Malo bi poboljšalo
- 3 - Would improve moderately —

3-Umjereno bi poboljšalo

• 4 - Would improve a lot — 4-Puno bi poboljšalo

• 5 - Would improve very much — 5-Veoma bi poboljšalo

20. If you had the opportunity, would you participate in a burnout prevention programme?

Da imate priliku, biste li sudjelovali u programu prevencije sindroma sagorijevanja?

Response format: check box (multiple selection technically possible; one answer intended)

- Yes — Da
- No — Ne
- Maybe — Možda

21. How would you rate the need for the introduction of special measures that would enable better working conditions and the preservation of the health of nurses and nursing technicians in intensive care units (e.g. accelerated pensionable service, an increase in the number of staff, additional psychological support)? (1 = not needed, 5 = very much needed)

Kako biste ocijenili potrebu za uvođenjem posebnih mjera koje bi omogućile bolje uvjete rada i očuvanje zdravlja medicinskih sestara i medicinskih tehničara u jedinicama intenzivnog liječenja (npr. beneficirani radni staž, povećanje broja zaposlenih, dodatna psihološka podrška)? (1-Nije potrebno, 5-Vrlo je potrebno)

Response format: check box (multiple selection technically possible; one answer intended)

- 1 - Not needed — 1-Nije potrebno
- 2 - Slightly needed — 2-Malo je potrebno

- 3 - Moderately needed — *3-Umjereno je potrebno*
- 4 - Fairly needed — *4-Prilično je potrebno*
- 5 - Very much needed — *5-Vrlo je potrebno*

Item mapping and treatment in the analysis

The table below shows how the questionnaire items correspond to the variables reported in the manuscript.

Item	Variable in the manuscript	Treatment in the analysis
1-6	Sex; age group; duration of ICU experience; ICU type; current ICU employment; shift pattern	Descriptive (Table 1); used as the five grouping variables in subgroup comparisons, except ICU type
7	Emotional exhaustion after a shift	Ordinal, 1-5
8	Difficulty maintaining emotional balance	Ordinal, 1-5
9	Emotional instability under stress	Ordinal, 1-5 (1 = very stable to 5 = very unstable)
10	Reduced motivation for work	Ordinal, 1-5
11	Exhausted even when away from work	Ordinal, 1-5
12	Considering a job change due to exhaustion	Ordinal, 1-5
13	Working automatically, without emotional connection	Ordinal, 1-5
14	Conflict with colleagues or supervisors	Ordinal, 1-5
15	Feeling undervalued by supervisors	Ordinal, 1-5
16	Work stress disrupts work-life balance	Ordinal, 1-5
17	Perceived impact of ICU conditions on mental health	Ordinal, 1-5 (no impact to very large impact)
18	Workplace psychological support	Ordinal, 1-5
19	Expected benefit of additional education	Ordinal, 1-5
20	Willingness to join a prevention programme	Nominal (yes / no / maybe); descriptive only, not entered into inferential tests
21	Perceived need for special organisational measures	Ordinal, 1-5

Note. Items 7-19 and 21 (14 items in total, excluding item 20) were treated as ordinal and were entered into the Spearman correlation analyses and the subgroup comparisons reported in the manuscript. Item 20 was treated as nominal and reported descriptively. Item 4 was recorded as free text and subsequently coded into the ICU-type categories shown in Table 1 of the manuscript.

Invalid multiple responses and analysis denominators

Of 185 records, four were excluded for no ICU experience. Among the 181 eligible records, there were no blank responses. Invalid multiple selections affected item 7 (2 records; valid $n = 179$), item 9 (7; $n = 174$), item 19 (2; $n = 179$), item 20 (2; $n = 179$) and item 21 (1; $n = 180$). All other outcome items had 181 valid responses. Five respondents selected both shift patterns and were excluded only from shift-pattern comparisons.

ICU-type recoding used in the revision

The table below documents every distinct ICU-type response among eligible records. Capitalisation, diacritics and obvious spelling variants were normalised for matching; the displayed source labels are retained. Cardiology includes coronary units; neurology includes neurosurgery; surgery includes cardiac surgery and urology; paediatric includes neonatal units. A general-unit descriptor followed only by a paediatric qualifier was treated as paediatric, whereas

explicit reports of different units were classified as multiple. Unclear abbreviations and nonspecific responses were retained in the residual category rather than assigned an inferred specialty.

This explicit recoding replaced the earlier descriptive unit classification; ICU type was not an inferential grouping variable. No independent clinical adjudication was performed.

Original ICU-type response	n	Recoded category
Ooći Jil	1	General ICU
Opci	4	General ICU
Opci JIL	4	General ICU
Opci Jil	4	General ICU
Opci jil	3	General ICU
Opci jil	1	General ICU
Opći	7	General ICU
Opći	2	General ICU
OPĆI JIL	1	General ICU
Opći JIL	35	General ICU
Opći JIL	1	General ICU
Opći Jil	6	General ICU
Opći jil	12	General ICU
opći jil	1	General ICU
Opći JIL	1	General ICU
Opći JIL anestezija	1	General ICU
Središnja jedinica intenzivnog liječenja	1	General ICU
Jedinica intenzivne koronarne skrbi	1	Cardiology/coronary ICU
JKS Koronarna	1	Cardiology/coronary ICU
Jil kardio	1	Cardiology/coronary ICU
Kardiološki	1	Cardiology/coronary ICU
Kardiološki jil	1	Cardiology/coronary ICU
Kardiološki(koronarna jedinica)	1	Cardiology/coronary ICU
Kardiološki	10	Cardiology/coronary ICU
Kardiološki JIL	1	Cardiology/coronary ICU
Kardiološki-koronarna jedinica	1	Cardiology/coronary ICU
Koronarna	2	Cardiology/coronary ICU
Koronarna Jedinica	1	Cardiology/coronary ICU
Koronarna jedinica	1	Cardiology/coronary ICU
Neurološki	1	Neurology/neurosurgical ICU
Jis nrl	1	Neurology/neurosurgical ICU
Neurokirurški	1	Neurology/neurosurgical ICU
Neurokirurški JIL	1	Neurology/neurosurgical ICU
Neurologija	1	Neurology/neurosurgical ICU
Neuroloski	1	Neurology/neurosurgical ICU
Neuroloski jil	1	Neurology/neurosurgical ICU
neuroloski jil	1	Neurology/neurosurgical ICU
Neurološka	1	Neurology/neurosurgical ICU
Neurološki	7	Neurology/neurosurgical ICU
Neurološki	1	Neurology/neurosurgical ICU
Neurološki JIL	2	Neurology/neurosurgical ICU

Original ICU-type response	n	Recoded category
NRL JIS	1	Neurology/neurosurgical ICU
JIL urološka	1	Surgical ICU
Kardiokirurški jil	1	Surgical ICU
Kardiokirurška	1	Surgical ICU
Kardiokirurški	3	Surgical ICU
Kardiokirurški JIL	2	Surgical ICU
Kardiokirurški	1	Surgical ICU
Kardiokirurški jil	1	Surgical ICU
Kardiokirurški	1	Surgical ICU
Kirurški	2	Surgical ICU
Kirurški	3	Surgical ICU
Kirurški	1	Surgical ICU
Kirurški JIL	1	Surgical ICU
Kirurški šok	1	Surgical ICU
Radila u kirurškoj KBSv.Duh	1	Surgical ICU
Urološki	1	Surgical ICU
Neonatologija JIL	1	Paediatric/neonatal ICU
Neonatologija	1	Paediatric/neonatal ICU
Nicu	3	Paediatric/neonatal ICU
Opći JIL- Pedijatrija	1	Paediatric/neonatal ICU
Pedijatrija	1	Paediatric/neonatal ICU
Pedijatrijska intenzivna	1	Paediatric/neonatal ICU
Pedijatrijska jedinica intenzivnog liječenja	1	Paediatric/neonatal ICU
/	1	Other, multiple or unspecified
Anesteziološki JIL	1	Other, multiple or unspecified
CIT	1	Other, multiple or unspecified
Interna intenzivna	2	Other, multiple or unspecified
Interna intenzivna d	1	Other, multiple or unspecified
Interna intenzivna skrb	1	Other, multiple or unspecified
Internistički JIL	1	Other, multiple or unspecified
Internistički	1	Other, multiple or unspecified
Internistički JIL	1	Other, multiple or unspecified
Jikl	1	Other, multiple or unspecified
JIL	2	Other, multiple or unspecified
Jil	1	Other, multiple or unspecified
JILD	1	Other, multiple or unspecified
Neonatologija i dječji JIL, urološki JIL	1	Other, multiple or unspecified
Nicu, traumatološka intenzivna , neurokirurška, opća intenzivna	1	Other, multiple or unspecified
Nisam	1	Other, multiple or unspecified
NRK, Urološki, toralni, opći	1	Other, multiple or unspecified
Opći JIL s koronarnom jedinicom	1	Other, multiple or unspecified
Opći JIL, kirurški JIL	1	Other, multiple or unspecified
Plućna int.	1	Other, multiple or unspecified
Pulmoloski	1	Other, multiple or unspecified
Pulmološki	1	Other, multiple or unspecified