

Original article

Impact of a Healthy Work Environment on Retention and Intent to Leave Among Croatian Intensive Care Nurses

Jelena Slijepčević^{1,2}, Slađana Režić¹, Adriano Friganović³, Nikolina Farčić⁴, Evanthia Georgiou⁵

¹ University Hospital Centre Zagreb, Croatia

² Faculty of Medicine, Josip Juraj Strossmayer University, Osijek, Croatia

³ University of Applied Health Sciences Zagreb, Zagreb, Croatia; Faculty of Health Studies, University of Rijeka, Rijeka, Croatia

⁴ Clinical Hospital Center Osijek, Osijek, Croatia; Faculty of Dental Medicine and Health, Josip Juraj Strossmayer University of Osijek, Croatia

⁵ Education Sector, Nursing Services, Ministry of Health, Nicosia, Cyprus

*Corresponding author: Jelena Slijepčević, jelena.slijepcevic.kbc@gmail.com

Abstract

Objectives To identify factors influencing nurse retention in critical care units and examine their relationship with the work environment.

Design and Setting: A quantitative cross-sectional study using a self-administered HWEAT survey conducted in 2021/2022 among ICU nurses in Croatia.

Methods: The Healthy Work Environment Assessment Tool (HWEAT), developed by the American Association of Critical-Care Nurses (AACN), was used to assess the work environment. The survey also included measures of workplace violence, moral distress, intention to leave, retention factors, and participants' sociodemographic characteristics. Convenience sampling was used to recruit nurses employed in intensive care units.

Results: A total of 277 ICU nurses participated, of whom 257 responses were retained after excluding incomplete surveys. The mean age was 32.9 years (SD 9.8), and the mean critical care experience was 9.3 years (SD 8.9). Overall, 30.4% of nurses reported being delighted with their jobs, 56% were somewhat satisfied, yet 34.2% indicated an intention to leave their positions. Nurses who frequently experienced moral distress were 2.8 times more likely to report an intention to leave. The key reasons prompting nurses to reconsider leaving were higher salaries and benefits (86%), better staffing (78%), and greater opportunities for professional development (75%). The main factors contributing to retention are competitive salaries and benefits, supportive interpersonal relationships, and effective leadership.

Conclusion: Approximately one-third of ICU nurses reported an intention to leave their current roles. These findings highlight the need for organizational strategies to reduce moral distress, improve staffing, increase salaries, and strengthen supportive and equitable work environments to enhance nurse retention and workforce stability.

(Slijepčević J, Režić S, Friganović A, Farčić, N, Georgiou E. Impact of a Healthy Work Environment on Retention and Intent to Leave Among Croatian Intensive Care Nurses. SEEMEDJ 2026; 10(1); 129-143)

Received: Nov 26, 2025; revised version accepted: Feb 26, 2026; published: Mar 23, 2026

KEYWORDS: critical care nursing, intention to leave, nurse retention, work environment

Introduction

The International Council of Nurses (ICN) highlighted in a March 2023 report that the worldwide shortage of nurses should be treated as a global health emergency. The report, *Recover to Rebuild: Investing in the Nursing Workforce for Health System Effectiveness*, outlines the pandemic's significant impact on nurse burnout, workforce sustainability, and access to care, emphasizing that investing in and protecting nurses is crucial for health system recovery (1).

The nursing shortage has gained heightened attention among international authorities, particularly in the aftermath of the COVID-19 pandemic (2,3). A 2008 study of 130 ICU nurses, 63 of whom reported an intention to leave their positions, indicated that the primary reasons for leaving intensive care units were solely related to personal job satisfaction. (4). The findings of recent studies are largely consistent. In addition to personal reasons for leaving or remaining, organizational factors include integration, leadership, professional collaboration, and communication (5). Transformational and supportive leadership foster a positive work environment and reduce turnover. Adequate staffing and resources are crucial, and effective nurse-physician collaboration contributes to staff retention. Work-life balance also plays a key role, with Generation Y being particularly sensitive to poor working conditions (6). Nurses' turnover is a multifactorial challenge that requires comprehensive research approaches and diverse intervention strategies.

This problem is even more pressing in intensive care settings, where the delivery of safe, high-quality care relies heavily on nurses with advanced, specialized training (7-11). In a European study conducted across five EU countries, with a sample of 1,033 intensive care nurses, one in three reported an intention to leave their position, largely due to preventable factors that can be addressed through organizational adjustments tailored to employees' needs (3). Several studies have examined factors related to nurses' workforce dynamics, including retention (12), intentions to

stay (13), intentions to leave (14-18), actual turnover (19), and retirement planning. Despite substantial evidence linking healthy work environments (HWEs) with improved outcomes, such as greater job satisfaction, better nurse retention, and enhanced patient safety, many nurses still report significant burnout, mental health difficulties, and a persistent intention to leave the workplace and profession (3, 20). Within this framework, the work environment is conceptualized as a constellation of organizational attributes that influence both the quality of nurses' professional lives and the standard of care provided to patients (21). In 2006, the American Association of Critical-Care Nurses (AACN) articulated a set of core standards for establishing a healthy work environment (HWE), comprising proficient communication, genuine interprofessional collaboration, participatory and transparent decision-making, sufficient staffing resources, meaningful professional recognition, and authentic leadership (22). Evidence consistently indicates that healthy work environments enhance nurse retention, improve well-being and job satisfaction, and reduce turnover and vacancy rates (23,24). The AACN developed and validated the "AACN Critical Care Nurse Work Environment Survey," which integrates the "Critical Elements of a Healthy Work Environment" scale (HWEAT version 1) (25) to assess ICU work environments. Their findings indicate that units adhering to these standards tend to exhibit improved outcomes for both nurses and patients.

The Healthy Work Environment Assessment Tool (HWEAT), long established and widely adopted in the United States, has since been validated and increasingly utilized in Canada (26), Japan (27), and several European countries, including Croatia (3, 28), reflecting its growing application in international research on healthy work environments. To address the challenges faced by European healthcare systems and gain insight into the factors influencing the work environment of intensive care nurses, the authors implemented an Erasmus+ project from 2019 to 2022 (<https://erasmus-plus.ec.europa.eu/projects/search/details/201>

9-1-CY01-KA202-058401) (29), involving five countries: Cyprus, Croatia, Spain, Poland, and Romania. Within this framework, a cross-sectional study was conducted focusing on Healthy Work Environment Factors as Determinants of Retention Among Croatian Critical Care Nurses, which underpins this article. This project also led to the development of a multilingual platform available in six languages that provides tools and comprehensive resources for nurses seeking to improve their work environment in intensive care settings (30). Additionally, a prior publication described the educational interventions for nurses that underpinned the platform (31). This article highlights the factors influencing nurses' decisions to remain in or leave intensive care units based on HWE standards.

Material and methods

Study design

A quantitative cross-sectional study was conducted using a self-administered survey distributed to ICU nurses from Croatia who had previously participated in the project mentioned in the study context.

Participants and data collection

A convenience sample of ICU nurses was invited to participate in the study. Because the total eligible population was unknown, the aim was to recruit the most significant and most feasible sample. In Croatia, there are a total of eight clinical hospitals and clinical hospital centres. An open invitation to participate was distributed to all institutions and published on the official Croatian Nurses Society of Anesthesia, Reanimation, Intensive Care and Transfusion (CNSARICT) website, making it reasonable to assume that nurses from all targeted institutions took part. However, no data were collected regarding the specific institution of each participant in order to ensure complete anonymity. Consequently, it is not possible to determine the proportional representation of respondents from individual clinical hospitals or clinical hospital centres. Nevertheless, it can be

stated with high confidence that respondents from all centres participated. Data were collected online using Qualtrics between January 2021 and April 2022.

Instrument and Data Analysis

Data were collected using the AACN Critical Elements of a Healthy Work Environment Scale from the 2018 National Survey of Critical-Care Nurse Work Environments, which incorporates the Healthy Work Environment Assessment Tool (HWEAT), version 1 (Cronbach's alpha = 0.97) (24). With AACN permission, the survey was translated into Croatian using a translation/back-translation process and pilot-tested with 30 ICU nurses. Sections A and C were adapted to the European context, whereas Section B remained unchanged. The self-administered survey comprised four sections: (A) quality of care and familiarity with AACN standards, (B) critical elements of a healthy work environment (16 items, 4-point Likert scale, institutional and unit levels), (C) staffing, moral distress, organizational support, workload, job satisfaction, turnover intentions, and retention factors, and (D) demographic information. Data were analyzed using R 4.1.0 and SPSS version 26. Descriptive statistics were calculated in accordance with the AACN guidelines (21). The normality of the distribution was verified using the Kolmogorov–Smirnov test. Participants were excluded if they completed only Section A or had >10% missing data in Sections B–D. Associations between healthy work environment indicators, demographics, and outcomes were examined using chi-square tests, t-tests, and one-way ANOVA. A multivariate binary logistic regression analysis was conducted to identify the independent factors associated with the intention to leave. The significance level was set at $\alpha = 0.05$. All P values reported in this manuscript are two-tailed.

Ethics

Ethical approval for this study was obtained from the Cyprus Bioethical Committee (CNBC 2020.01.145) as Cyprus served as the lead

coordinating country for the Erasmus+ project. Participants were provided with detailed information about the study's objectives on the first page of the questionnaire and were required to provide informed consent before accessing the survey questionnaire. To ensure confidentiality and anonymity, the responses were self-administered, and the participants generated unique alphanumeric codes to prevent multiple submissions. The raw database was accessible only to an independent statistician not involved in the research team, who managed data cleaning, analysis, and reporting; codes were deleted before analysis. This procedure ensured secure data handling and consistency in coding and comparative analysis. The study was conducted in accordance with ethical standards and reported in accordance with CROSS guidelines (33).

Results

Descriptive findings

A total of 257 ICU nurses participated in this study. A total of 68% (n = 172) were women, with a mean age of 32.9 years (SD = 9.8). The majority of respondents were bedside nurses (n = 214; 84.6%), with a mean nursing experience of 11.3 years (SD 9.9) and 9.3 years (SD 8.9) in critical care. Overall, 30.4% (n = 78) of respondents were very or somewhat satisfied with their status as registered nurses, and 56% (n = 144) were slightly happy with their current jobs. It is interesting to note that only a small percentage of nurses had received training in the field of intensive care (8.7%), which clearly indicates a lack of adequate education and professional development for intensive care nurses (91.3%). (Table 1).

Table 1. Demographic characteristics of participants

		N	%
Gender	Male	62	24.5
	Female	172	68.0
	Prefer not to answer	19	7.5
Total		253	100.0
What is the highest degree you have received?	Diploma in Nursing	76	30.0
	Bachelor Degree	139	54.9
	Master's degree in Nursing	36	14.2
	Doctoral Degree	2	8
Total		253	100.0
Did you attend a special training/education in critical/intensive care nursing?	Yes	22	8.7
	No	231	91.3
Total		253	100.0
Current position	Unit Manager	27	10.7
	Bedside Nurse	214	84.6
	Unit Educator	2	8
	Other (please specify)	10	4.0
Total		253	100.0
Satisfaction with being a nurse	Very satisfied	78	30.4
	Somewhat satisfied	144	56.0
	Somewhat dissatisfied	23	8.9
	Very dissatisfied	12	4.7
Total		257	100
		M	SD[†]
Age		32.9	9.8
Years of nursing experience		11.3	9.9
Years of nursing experience in the ICU		9.3	8.9

* M (mean);

† SD (standard deviation)

Intention to leave current nursing position

Of all responses among intensive care nurses (N = 257), 26% (n = 66) reported an intention to leave their current nursing position within the next three years, while 8.2% (n = 21) indicated that they planned to leave within the next 12 months. Most participants (66%, n = 170) reported no intention to leave their current position within the next three years. (Table 2.)

Nurses who frequently experienced moral distress had 3 times more chance of having the intention to leave (OR=3.077, CI: 1.137-8.329, p=0.03), and nurses who frequently experienced moral distress had 2.4 times more chance of having the intention to leave (OR=2.378, CI: 1.055-

5.361, P=0.04), compared to nurses who rarely experienced moral distress. (Table 3)

Table 2. Intention to leave current nursing position

Overall Croatia, N = 257	P-value
	<0.001
Do you plan to leave your current nursing position?	
Yes, within the next 3 years	66(26%)
Yes, within the next 12 months	21 (8.2%)
No plans to leave within the next 3 years	170 (66%)

*Pearson's chi-squared test. Bold denotes statistical significance.

Table 3. Impact of moral distress on intention to leave

	B	P	OR	95% C.I.	
		0.001			
Very frequently	1.124	0.03	3.077	1.137	- 8.329
Frequently	.866	0.04	2.378	1.055	- 5.361
Occasionally	-0.215	0.596	0.806	0.364	- 1.786
Constant	-0.981	0.004	0.375		

Table 4. Impact of moral distress and other work aspects on intention to leave

	B	P	OR	95% C.I.	
Very frequently	1.065	0.05	2.899	0.991	- 8.485
Frequently	1.041	0.04	2.832	1.147	- 6.989
Occasionally	-0.199	0.64	.820	0.352	- 1.911
More flexible scheduling (<i>likely</i>)	-0.050	0.89	.951	0.475	- 1.907
Higher salary and benefits (<i>likely</i>)	0.370	0.54	1.448	0.445	- 4.713
More autonomy (<i>likely</i>)	0.296	0.48	1.344	0.589	- 3.067
More opportunities to influence decisions about patient care (<i>likely</i>)	-0.454	0.26	0.635	0.287	- 1.408
More respect from unit management	0.338	0.44	1.402	0.592	- 3.321
Better staffing (<i>likely</i>)	0.533	0.30	1.704	0.617	- 4.704
More respect from the administration (<i>likely</i>)	-0.506	0.23	0.603	0.264	- 1.377
More opportunities for professional development (<i>likely</i>)	0.379	0.40	1.460	0.603	- 3.539
Better leadership (<i>likely</i>)	1.337	0.007	3.807	1.443	- 10.044
More/better equipment and technology resources (<i>likely</i>)	-0.717	0.077	0.488	0.220	- 1.082
More meaningful recognition for my contribution (<i>likely</i>)	-0.272	0.56	0.762	0.308	- 1.883
Constant	-2.243	<0.001	0.106		

Bold denotes statistical significance.

*B (Beta coefficient / regression coefficient)

*P (p-value / statistical significance)

*OR (Odds Ratio)

* C.I. (95% Confidence Interval)

Nurses who frequently experienced moral distress had a 2.8-fold higher likelihood of intending to leave (OR=2.832, CI: 1.147-6.899, P=0.04) than those who rarely experienced moral distress. Those nurses who believed that better leadership would influence their consideration of leaving their current position had a 3.8 times higher chance of leaving (higher intention to go) (OR=3.807, CI: 1.443-10.044, P=0.007). Nagelkerke R²=0.193 (19% of variance explained), with Hosmer-Lemeshow test for goodness-of-fit Chi-square=5.666, df=8, p=0.685) (Table 4).

Logistic regression was used to examine several potential predictors of the likelihood of job departure. Nagelkerke R²=0.114 (11% of explained variance), with Hosmer-Lemeshow test for goodness-of-fit Chi-square=3.107, df=7, p=0.875.) Among all predictors, only "better leadership (likely)" showed a statistically significant association with the odds of leaving (B = 1.243, P = .009, OR = 3.466, 95% CI [1.360–8.833])

(Table 5). This finding indicates that employees who believe that better leadership would increase their likelihood of staying are currently more likely to consider leaving their jobs. This suggests that deficiencies in leadership quality may be the most influential factor contributing to turnover intention in this sample. All other variables—including flexible scheduling, higher salaries and benefits, autonomy, staffing, respect from management and administration, and access to better equipment or professional development—were not statistically significant. Although some showed directional trends (e.g., better staffing and higher salaries were associated with slightly higher odds of leaving), these effects did not reach statistical significance. Overall, the model highlights that leadership quality is the key determinant of employees' intention to leave, underscoring the importance of strong, supportive, and effective leadership for employee retention. (Table 5).

Table 5. Regression analysis on predictors of odds for leaving the job

	B	P	OR	95% C.I.	
More flexible scheduling (<i>likely</i>)	-0.006	0.99	.994	0.514	– 1.925
Higher salary and benefits (<i>likely</i>)	0.532	0.36	1.702	0.546	– 5.304
More autonomy (<i>likely</i>)	0.139	0.73	1.149	0.523	– 2.523
More opportunities to influence decisions about patient care (<i>likely</i>)	-0.362	0.35	0.696	0.325	– 1.490
More respect from unit management	0.285	0.50	1.330	0.585	– 3.023
Better staffing (<i>likely</i>)	0.466	0.34	1.594	0.613	– 4.143
More respect from the administration (<i>likely</i>)	-0.194	0.62	.823	0.381	– 1.780
More opportunities for professional development (<i>likely</i>)	0.247	0.57	1.281	0.544	– 3.017
Better leadership (<i>likely</i>)	1.243	0.009	3.466	1.360	– 8.833
More/better equipment and technology resources (<i>likely</i>)	-0.649	0.09	0.523	0.244	– 1.118
More meaningful recognition for my contribution (<i>likely</i>)	-0.120	0.79	0.887	0.373	– 2.112
Constant	-2.092	<0.001	.123		

Bold denotes statistical significance.

*B (Beta coefficient / regression coefficient); *P (p-value / statistical significance)

*OR (Odds Ratio); * C.I. (95% Confidence Interval)

Intention to stay and related factors

Among all ICU nurses, the most relevant factors for reconsidering their decision to stay in their workplace were a higher salary and benefits

(86% %; n = 219), better staffing (78 %; n = 200), and more opportunities for professional development (75 %; n = 191) (Table 6).

Table 6. How likely is each of the following to influence you to reconsider your plans to leave your present position?

	N (%) [†]	P-value [†]
Higher salary and benefits	219 (86%)	<0.001
More opportunities for professional development	191 (75%)	0.008
Better staffing	200 (78%)	<0.001
More meaningful recognition for my contribution	180 (70%)	0.003
Better leadership	180 (70%)	<0.001
More respect from the administration	162 (63%)	<0.001
More respect from unit management	161 (63%)	<0.001
More/better equipment and technology resources	163 (64%)	0.990
More flexible scheduling	144 (56%)	<0.001
More opportunities to influence decisions about patient care	150 (59%)	<0.001
More autonomy	164 (64%)	0.010

[†]Each factor was responded to in a Likert scale of 4 points, and the table shows the number of respondents who replied "very likely or somewhat likely" to each factor.

†Pearson's Chi-squared test

The most critical factors contributing to nurses' retention within their current organizations were salary and benefits (n = 164, 64%) and relationships with colleagues (n = 87, 34%). Although none of the differences were statistically significant, it is evident that

interpersonal relationships and the work environment play a more influential role in job satisfaction and retention than formal aspects, such as opportunities for advancement or managerial support. (Table 7.)

Table 7. The main factors that keep nurses working in the current organization, according to job satisfaction

What are the main factors that keep you working in your current organization?	How satisfied are you with your current job?				P-value
	Dissatisfied		Satisfied		
	n	%	n	%	
People I work with	9	21.4	77	36.3	0.062
Salary and benefits	25	59.5	138	65.1	0.492
Patients I care for	10	23.8	41	19.3	0.509
Manager of my work unit	1	2.4	7	3.3	0.755
Reputation of the organization	1	2.4	13	6.1	0.330
Work environment			25	11.8	-
Support for nurses	1	2.4	2	0.9	0.431
Level of staffing			2	0.9	-
Meaningful recognition	1	2.4	1	0.5	0.201
Opportunities for professional development	7	16.7	25	11.8	0.384
Opportunities for advancement			20	9.4	-
Location	9	21.4	33	15.6	0.350
Work schedule	10	23.8	34	16.0	0.224

†Pearson Chi-Square test

Higher salaries and benefits, greater respect from the unit manager, improved staffing, more opportunities for professional development, and better leadership had a greater impact on nurses

who intended to leave, prompting them to reconsider their plans (significantly more than on nurses who did not plan to leave the position). (Table 8.).

Table 8. Influence of different work aspects on reconsideration plans to leave current position according to intention to leave the position

		Do you plan to leave your current nursing position?				p [†]
		No		Yes		
		n	%	n	%	
More flexible scheduling	Not likely	79	47.0	33	38.8	0.22
	Likely	89	53.0	52	61.2	
Total		168	100.0	85	100.0	
Higher salary and benefits	Not likely	29	17.3	6	7.1	0.03
	Likely	139	82.7	79	92.9	
Total		168	100.0	85	100.0	
More autonomy	Not likely	65	38.7	24	28.6	0.11
	Likely	103	61.3	60	71.4	
Total		168	100.0	84	100.0	
More opportunities to influence decisions about patient care	Not likely	72	42.9	32	38.1	0.47
	Likely	96	57.1	52	61.9	
Total		168	100.0	84	100.0	
More respect from unit management	Not likely	71	42.3	22	26.2	0.01
	Likely	97	57.7	62	73.8	
Total		168	100.0	84	100.0	
Better staffing	Not likely	44	26.2	11	13.1	0.02
	Likely	124	73.8	73	86.9	
Total		168	100.0	84	100.0	
More respect from the administration	Not likely	67	39.9	25	29.4	0.01
	Likely	101	60.1	60	70.6	
Total		168	100.0	85	100.0	
More opportunities for professional development	Not likely	49	29.2	15	17.6	0.05
	Likely	119	70.8	70	82.4	
Total		168	100.0	85	100.0	
Better leadership	Not likely	63	37.5	12	14.1	<0.001
	Likely	105	62.5	73	85.9	
Total		168	100.0	85	100.0	
More/better equipment and technology resources	Not likely	63	37.5	28	33.3	0.52
	Likely	105	62.5	56	66.7	
Total		168	100.0	84	100.0	
More meaningful recognition for my contribution	Not likely	56	33.3	19	22.4	0.07
	Likely	112	66.7	66	77.6	
Total		168	100.0	85	100.0	
Other (please specify)	Not likely	93	70.5	37	58.7	0.10
	Likely	39	29.5	26	41.3	
Total		132	100.0	63	100.0	

†Pearson Chi-Square test. Bold denotes statistical significance

Discussion

The present study, which included 257 Croatian ICU nurses, offers valuable insights into the complex interplay of organizational and psychological factors influencing turnover intentions. Notably, 26 % of the sample intended to leave within three years, and 8.2 % planned to

leave within the next 12 months. These numbers closely mirror the findings in other high-stress healthcare environments, underlining that turnover in ICU staffing remains a pressing issue.

Leadership as a Key Driver of Turnover Intentions

Our finding that perceived leadership quality is a significant predictor of the intention to leave (OR = 3.466) aligns well with the existing literature. For instance, a cross-sectional study found that nurse managers' authentic listening, concern, and genuine team engagement are strongly linked to compassion satisfaction and job satisfaction among ICU nurses (34). Leadership styles that emphasize humility and expertise also appear to reduce turnover intentions; research has shown that "humble leadership" is associated with lower nurse turnover, particularly when the leader possesses domain expertise (35). Furthermore, qualitative research has highlighted the role of leadership in addressing moral distress: ICU nurse leaders can recognize and mitigate moral distress among their staff, and when leaders themselves experience moral distress, it may exacerbate turnover risk (36). Therefore, our results support the notion that leadership is not only a structural issue but is also deeply intertwined with the moral and emotional components of the ICU.

Moral Distress and Its Impact

Moral distress strongly predicted intention to leave in our cohort, with frequent distress increasing the odds by 2.4–3.1 times. This finding is consistent with previous studies, including those among Latvian ICU nurses, which have shown that moral distress correlates with burnout and turnover intentions and that this relationship is partially mediated by burnout (37). In that study, moral distress was a robust predictor of both emotional exhaustion and turnover (37). These findings emphasize the psychological burden faced by ICU nurses, demonstrating how ethical conflicts and emotional strain directly translate into instability in the workforce. This suggests that interventions should not only address surface-level organizational issues but also integrate support for moral resilience and ethical coping mechanisms.

Although our study did not directly measure burnout, the strong association between moral distress and turnover intention is consistent with

prior evidence that burnout mediates the relationship between distress and turnover.

Staffing, Salary, and Professional Development

While a large proportion of respondents identified salary as an important factor, the regression analysis demonstrated that, after controlling for other variables such as working conditions, leadership, organizational support, and workload, salary did not account for a statistically significant share of the variance in intention to leave. This apparent discrepancy highlights the complexity of retention dynamics. In our study, although variables such as staffing, salary, and professional development did not reach statistical significance in the multivariate analysis, they were frequently cited by nurses as critical considerations when reconsidering leaving. This suggests that retention is inherently multifactorial: while leadership and moral distress appear to exert the strongest predictive influence, structural workplace conditions—including compensation, staffing adequacy, and opportunities for professional growth—remain salient in shaping nurses' decisions to remain in their roles. Salary, therefore, may operate less as an independent predictor and more as part of a broader constellation of organizational conditions influencing retention.

Implications for Practice and Policy

To reduce turnover intentions among ICU nurses, healthcare organizations should actively address moral distress through supportive dialogue and ethical resources, ensure adequate staffing levels, and offer competitive salaries that reflect the demands of critical care work. Strengthening leadership practices and fostering a fair, supportive work environment are crucial for enhancing job satisfaction and retaining both experienced and newly graduated ICU nurses.

Conclusion

This study provides a comprehensive overview of the factors shaping turnover intentions among Croatian ICU nurses, highlighting the intertwined

influence of organizational dynamics and psychological demands on turnover intention. The proportion of nurses considering leaving their positions in the near term reflects a broader international challenge and highlights the vulnerability of the critical care workforce. Leadership emerged as a central determinant of nurses' intention to leave, emphasizing that the quality of managerial support extends beyond administrative functions and encompasses the emotional, ethical, and relational aspects of the work environment. Moral distress was also a strong predictor of turnover intention, underscoring the need for institutions to address the ethical complexities of ICU practice and develop systems that support moral resilience. Although structural aspects such as staffing and opportunities for professional development were not independently predictive in multivariate models, they remained salient concerns among nurses. These factors should not be overlooked in retention strategies. Overall, the findings suggest the need for a multifaceted approach to enhance nurse retention in the ICU setting. Efforts to strengthen leadership competencies, reduce sources of moral distress, and ensure fair and sustainable working conditions are essential to support the well-being of ICU nurses and maintain stability within critical care teams.

Strengths & limitations

The strength of this study lies in the potential heterogeneity of the sample. The recruitment strategy facilitated the inclusion of participants

from a range of clinical settings, thereby broadening the spectrum of perspectives represented in the study. For the first time, a validated questionnaire on healthy work environments was employed, highlighting the significance of the work environment in intensive care units and its influence on nurses' intention to leave or remain in their positions. The study's limitations include its implementation during the COVID-19 pandemic and the potential for bias, given that the researchers were nurses working in intensive care settings.

Acknowledgement. This study was conducted as part of the Erasmus+ project consortium entitled: "Improving Working Environments for Critical Care Nurses—HWE4CCN" (Erasmus+ KA2, ref. number 2019-1-CY01-KA202-058401). We extend our sincere thanks to all the participating nurses for their contributions. We also gratefully acknowledge the authors of the American Association of Critical-Care Nurses' Critical Elements of a Healthy Work Environment Scale for granting permission to adapt, translate, and use their instrument, as referenced in the 2018 National Survey of Critical-Care Nurse Work Environments (Aliso Viejo, CA: AACN, 2018). All content in this article has been independently written, interpreted, and edited by the authors and does not constitute any form of plagiarism.

Disclosure

Funding. No specific funding was received for this study.

Competing interests. None to declare.

References

1. Buchan J, Catton H. International Council of Nurses. Report: Recover to Rebuild: Investing in the Nursing Workforce for Health System Effectiveness. 2023 by ICN - Geneva (Switzerland) Available at: https://www.icn.ch/sites/default/files/2023-07/ICN_Recover-to-Rebuild_report_EN.pdf
2. World Health Organization. Global Strategic Directions for Nursing and Midwifery (2021–2025). <https://www.who.int/publications/i/item/9789240033863>; 2021 (accessed 7 November 2024).
3. Llauro-Serra M, Curado Santos E, Perpiñán Grogues M, Constantinescu-Dobra A, Coțiu M.A., Dobrowolska B, Friganović A, Gutysz-Wojnicka A, Hadjibalassi M, Ozga D, Režić S, Sabou A, Slijepčević J, Georgiou E. Critical care nurses' intention to leave and related factors: Survey results from 5 European countries, Intensive and Critical Care Nursing, 2025, ISSN 0964-3397, <https://doi.org/10.1016/j.iccn.2025.103998>.

4. Hui-Ling Lai et al. Intensive care unit staff nurses: Predicting factors for career decisions. *Journal of Clinical Nursing* 17. 1886-1896. 2008 Publishing Ltd doi: 10.1111/j.1365-2702.2007.02180.x
5. Lesnik T, Hauser-Oppelmayer A. Turnover intention among intensive care nurses and the influence of the COVID-19 pandemic: a scoping review *Human Resources for Health* (2025) 23:23 .<https://doi.org/10.1186/s12960-025-00992-7>
6. Figueiredo A.R., Baixinho C, Lucas P. Nursing practice environment influences retention and turnover intention: An umbrella review, *Collegian*. ISSN 1322-7696. 2025.<https://doi.org/10.1016/j.colegn.2025.09.008i>
7. Pressley C, Garside J. Safeguarding the retention of nurses: a systematic review on determinants of nurses' intention to stay. *Nurs Open* 2023;10:2842–58. <https://doi.org/10.1002/nop2.1588>.
8. Tamata AT, Mohammadnezhad M. A systematic review study on the factors affecting the shortage of the nursing workforce in hospitals. *Nurs Open* 2023;10: 1247–57. <https://doi.org/10.1002/NOP2.1434>.
9. Aiken, LH, Sermeus, W, McKee, M, Lasater, KB, Sloane, D, Pogue, CA, et al. Physician and nurse well-being, patient safety, and recommendations for interventions: a cross-sectional survey in hospitals in six European countries. *BMJ Open* 2024;14: e079931. <https://doi.org/10.1136/bmjopen-2023-079931>.
10. Vincent JL, Boulanger C, van Mol MMC, Hawryluck L, Azoulay E. Ten areas for ICU clinicians to be aware of to help retain nurses in the ICU. *Crit Care* 2022;26. <https://doi.org/10.1186/s13054-022-04182-y>.
11. Xu G, Zeng X, Wu X. Global prevalence of turnover intention among intensive care nurses: a meta-analysis. *Nurs Crit Care* 2023;28:159–66. <https://doi.org/10.1111/NICC.12679>
12. Moseley A, Jeffers L, Paterson J. Retention of the older nursing workforce: A literature review exploring factors that influence the retention and turnover of older nurses. *Contemp. Nurse* 2008, 30, 46–56.
13. Li Y, Zhang R, Kang L, Ma G. Relationship between retention intention, perceived organizational support, and medical narrative ability among nurses: a cross-sectional multi-center study. *Front. Health Serv.* 2025, 5:1648464. doi: 10.3389/frhs.2025.1648464
14. Chan ZC, Tam WS, Lung MK, Wong WY, Chau C.W. A systematic literature review of nurse shortages and the intention to leave. *J. Nurs. Manag.* 2013, 21, 605–613.
15. De Oliveira DR, Griep RH, Portela LF, Rotenberg L. Intention to leave the profession, psychosocial environment, and self-rated health among registered nurses from large hospitals in Brazil: A cross-sectional study. *BMC Health Serv. Res.* 2017, 17, 21.
16. Hasselhorn HM, Tackenberg P, Kuemmerling A, Wittenberg J, Simon M, Conway PM, Bertazzi PA, Beermann B, Büscher A, Mueller BH et al. Nurses' health, age, and wish to leave the profession: Findings from the European NEXT-Study. *La Med. Del Lav.* 2006, 97, 207–214. [
17. Leineweber C, Chungkham HS, Lindqvist R, Westerlund H, Runesdotter S, Alenius LS, Tishelman C. Nurses' practice environment and satisfaction with schedule flexibility are related to intention to leave due to dissatisfaction: A multi-country, multilevel study. *Int. J. Nurs. Stud.* 2016, 58, 47–58.
18. Salehi T, Barzegar M, Yekaninejad M, and Ranjbar H. Relationship between healthy work environment, job satisfaction, and anticipated turnover among intensive care unit (ICUs). *Ann. Med. Health Sci. Res.* 2020, 10, 825–826

19. Nei D, Snyder LA, Litwiller BJ. Promoting retention of nurses: A meta-analytic examination of the causes of nurse turnover. *Health Care Manag. Rev.* 2015, 40, 237–253
20. Kramer M, Schmalenberg C. Confirmation of a Healthy Work Environment. *Critical Care Nurse.* Vol. 28, No. 1, 2008.
21. Ulrich B, Barden C, Cassidy L, Varn-Davis N. Critical care nurses' work environments 2018: Findings and implications. *Crit Care Nurse* 2019;39:67–84. <https://doi.org/10.4037/CCN2019605>.
22. American Association of Critical-Care Nurses. Healthy Work Environments 2006. <https://www.aacn.org/nursing-excellence/healthy-work-environments>; 2006 [accessed 14 October 2025].
23. Ulrich B, Cassidy L, Barden C, Varn-Davis N, Delgado SA. National Nurse Work Environments–October 2021: A Status Report. *Crit Care Nurse* 2022;42:58–70. <https://doi.org/10.4037/ccn2022798>.
24. Ulrich BT, Lavandero R, Woods D, Early S. Critical care nurse work environments 2013: A status report. *Crit Care Nurse* 2014;34:64–79. <https://doi.org/10.4037/ccn2014731>
25. American Association of Critical-Care Nurses. AACN Healthy Work Environment Assessment Tool <https://www.aacn.org/nursing-excellence/healthy-workenvironments>; 2018 [accessed 20 October 2025].
26. Vincelette C, Rochefort CM. Adapting the Healthy Work Environment Assessment Tool for French-Canadian Intensive Care Unit Nurses. *AJCC* 2023;32:62–70. <https://doi.org/10.4037/ajcc2023298>
27. Kitayama M, Unoki T, Matsuda Y, Matsuishi Y, Kawai Y, Iida Y, et al. Development and initial validation of the Japanese Healthy Work Environment Assessment Tool for Critical Care Settings. *PLoS One* 2022;17. <https://doi.org/10.1371/journal.pone.0268124>.
28. Friganović A, Slijepčević J, Režić S, Cristina Alfonso-Arias C, Borzuchowska M, Constantinescu-Dobra A, et al. Critical Care Nurses' Perceptions of Abuse and Its Impact on Healthy Work Environments in Five European Countries: A Cross-Sectional Study. *Int J Public Health* 2024;69. <https://doi.org/10.3389/ijph.2024.1607026>
29. Erasmus + KA2 ref. number 2019-1-CY01-KA202-058401: <https://erasmus-plus.ec.europa.eu/projects/search/details/2019-1-CY01-KA202-058401>
30. Improving the Working Environment for Nurses in the Critical Care Unit. Online course. This study was co-funded by the Erasmus+ Programme. Available at: <https://sites.google.com/view/hwe4ccn/home?authuser>
31. Georgiou E, Hadjibalassi M, Friganovic A, Sabou A, Gutysz-Wojnicka A, Constantinescu-Dobra A, et al. Evaluation of a blended training solution for critical care nurses' work environment: Lessons learned from focus groups in four European countries. *Nurse Educ Pract* 2023;73. <https://doi.org/10.1016/J.NEPR.2023.103811>
32. Van Den Bulcke B, Metaxa V, Reyners AK, Rusinova K, Jensen HI, Malmgren J, et al. Ethical climate and intention to leave among critical care clinicians: An observational study in 68 intensive care units across Europe and the United States. *Intensive Care Med* 2020;46:46–56. <https://doi.org/10.1007/s00134-019-05829>
33. Sharma A, Minh Duc NT, Luu Lam Thang T, Nam NH, Ng SJ, Abbas KS, Huy NT, Marušić A, Paul CL, Kwok J, Karbwang J, de Waure C, Drummond FJ, Kizawa Y, Taal E, Vermeulen J, Lee GHM, Gyedu A, To KG, Verra ML, Jacqz-Aigrain ÉM, Leclercq WKG, Salminen ST, Sherbourne CD, Mintzes B, Lozano S, Tran US, Matsui M, Karamouzian M. A Consensus-Based Checklist for Reporting Survey Studies (CROSS). *J Gen Intern Med.* 2021 Oct;36(10):3179–3187. Doi: 10.1007/s11606-021-06737-1. Epub 2021 Apr 22. PMID: 33886027; PMCID: PMC8481359.
34. Cosentino C, De Luca E, Sulla F, Uccelli S, Sarli L, Artioli G. Leadership styles' influence on ICU nurses' quality of professional life: A cross-sectional study. *Nurs Crit Care.* 2023 Mar;28(2):193–201. doi: 10.1111/nicc.12738. Epub 2021 Dec 28. PMID: 34964216.

35. Abdelaliem SMF, Asal MGR, Abou Zeid MAG, Hendy A, El-Sayed AAI. Humble leadership and nurses' turnover intention: The moderating effect of leader expertise. *Int Nurs Rev.* 2025 Jun;72(2):e13025. doi: 10.1111/inr.13025. Epub 2024 Jul 22. PMID: 39037107.
36. Miller PH, Epstein EG, Smith TB, Welch TD, Smith M, Bail JR. Critical care nurse leaders addressing moral distress: A qualitative study. *Nurs Crit Care.* 2024 Jul;29(4):835-838. Doi: 10.1111/nicc. 13045. Epub 2024 Feb 23. PMID: 38400568.
37. Cerela-Boltunova O, Millere I, Nagle E. Moral Distress, Professional Burnout, and Potential Staff Turnover in Intensive Care Nursing Practice in Latvia: Phase 1. *Int. J Environ. Res. Public Health.* 2025 Aug 12;22(8):1261. doi: 10.3390/ijerph22081261. PMID: 40869846; PMCID: PMC12386003.

Author contribution.

Acquisition of data: JS, SR, AF, EG

Administrative, technical, or logistic support: AF, EG, NF

Analysis and interpretation of data: JS, SR, EG

Conception and design: JS, SR, AF, EG, NF

Critical revision of the article for important intellectual content: NF, EG

Drafting of the article: JS, SR, AF, EG

Final approval of the article: EG, AF, NF

Provision of study materials or patients: JS, SR, AF, EG



2026. Slijepčević J, Režić S, Friganović A, Farčić, N, Georgiou E.

This article is published under the terms of the Creative Commons Attribution License (CC BY 4.0) (<https://creativecommons.org/licenses/by/4.0/>).

Utjecaj zdravog radnog okruženja na zadržavanje i namjeru odlaska medicinskih sestara i tehničara u jedinicama intenzivnoga liječenja

Sažetak

Cilj: Identificirati čimbenike koji utječu na zadržavanje medicinskih sestara u jedinicama intenzivnog liječenja te ispitati njihov odnos s radnim okruženjem.

Metode: Kvantitativno presječno istraživanje provedeno pomoću samoprocjenskog upitnika HWEAT tijekom 2021./2022. među medicinskim sestrama u jedinicama intenzivnog liječenja u Hrvatskoj. Za procjenu radnog okruženja korišten je alat Healthy Work Environment Assessment Tool (HWEAT), razvijen od strane American Association of Critical-Care Nurses (AACN). Upitnik je također uključivao mjere nasilja na radnom mjestu, moralnog distresa, namjere napuštanja radnog mjesta, čimbenika zadržavanja te sociodemografskih obilježja sudionika. Za uključivanje medicinskih sestara zaposlenih u jedinicama intenzivnog liječenja korišten je prigodni uzorak.

Rezultati: Sudjelovalo je ukupno 277 medicinskih sestara iz jedinica intenzivnog liječenja, od čega je 257 odgovora zadržano nakon isključivanja nepotpunih upitnika. Prosječna dob iznosila je 32,9 godina (SD 9,8), a prosječno radno iskustvo u intenzivnoj skrbi 9,3 godine (SD 8,9). Ukupno je 30,4% medicinskih sestara izjavilo da su oduševljene svojim poslom, 56% je bilo donekle zadovoljno, dok je 34,2% iskazalo namjeru napuštanja radnog mjesta. Medicinske sestre koje su često doživljavale moralnu nelagodu imale su 2,8 puta veću vjerojatnost da će iskazati namjeru odlaska. Ključni razlozi zbog kojih medicinske sestre razmatraju odlazak uključuju veće plaće i beneficije (86%), bolje kadrovsko popunjavanje (78%) te veće mogućnosti profesionalnog razvoja (75%). Glavni čimbenici zadržavanja su konkurentne plaće i beneficije, podržavajući međuljudski odnosi i učinkovito vodstvo.

Zaključak: Otprilike jedna trećina medicinskih sestara u jedinicama intenzivnog liječenja iskazala je namjeru napuštanja trenutnih radnih mjesta. Ovi nalazi naglašavaju potrebu za organizacijskim strategijama usmjerenima na smanjenje moralne nelagode, poboljšanje kadrovske popunjenosti, povećanje plaća te jačanje podržavajućeg i pravednog radnog okruženja kako bi se unaprijedilo zadržavanje medicinskih sestara i stabilnost radne snage..

Ključne riječi: sestrinstvo u intenzivnom liječenju; namjera odlaska, zadržavanje medicinskih sestara i tehničara, radno okruženje