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WORK ENVIRONMENT OF CRITICAL CARE NURSES IN CROATIA: NATIONAL CROSS-SECTIONAL SURVEY

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ABSTRACT

Background: Working in a supportive, healthy environment has a direct and positive impact on patient satisfaction and is also closely linked to nurse retention, job satisfaction, turnover, and burnout. The aim of the study was to focus on the perceptions and experiences of critical care nurses in Croatia.

Methods: A quantitative cross-sectional study was conducted using a self-administered questionnaire, the Healthy Work Environment Assessment Tool, distributed to intensive care nurses in Croatia. Data analysis was conducted using R (version 4.1.0; R Core Team, 2021) and SPSS (version 26 for Windows). Descriptive statistics were used to assess the state of critical care nurses' work environments across the six American Association of Critical-Care Nurses subscales.

Results: The mean scores for the implementation of the American Association of Critical-Care Nurses Healthy Work Environment. Standards at the unit level indicate moderate levels across all six domains. Among 277 nurses, the highest mean score was observed for Meaningful Recognition ($M = 2.7$, $SD = 0.7$), followed by True Collaboration and Authentic Leadership ($M = 2.5$, $SD = 0.6-0.7$). Lower scores were reported for Skilled Communication, Effective Decision-Making, and Appropriate Staffing ($M = 2.4$, $SD = 0.6-0.7$). All mean differences were statistically significant ($p < 0.001$).

Conclusions: Targeted investments in staffing infrastructure, leadership training, formal recognition systems, and psychological safety protocols are crucial for fostering

healthier work environments, enhancing nurse retention, and ultimately improving patient outcomes.

Keywords: Nurses, critical care, healthy, work environment, Croatia.

INTRODUCTION

A supportive work environment in nursing should actively enhance nurses' physical, mental, and social well-being, as emphasized by the World Health Organization (WHO) (1,2). Although numerous studies confirm the connection between healthy work environments (HWE) and outcomes such as job satisfaction, nurse retention, and patient safety, many nurses continue to experience high levels of burnout, mental health challenges, and an ongoing desire to leave the profession (3). In recent years, the shortage of nurses has been recognized as a global issue, which unfortunately has worsened in the aftermath of the COVID-19 pandemic (4,5). Findings from two systematic reviews reveal that between 18% and 57% of new nurses exit the profession within two to three years of obtaining their licenses (6,7). This trend reflects evolving values among younger generations, who place greater emphasis on work-life balance, recognition, a sense of being valued by their organization, job satisfaction, and the overall quality of the work environment—more so than previous generations (6,7,8). The rising demand for critical care services has created a significant global challenge for healthcare organizations in recruiting and retaining qualified critical care nurses (9). Considering these developments, there is an urgent need to strengthen efforts

aimed at recruiting and retaining intensive care nurses to ensure the sustainability and quality of critical care delivery. The WHO has acknowledged the current state and global crisis facing the nursing profession, emphasizing in a recent report that the situation in Europe is alarming and calling for the urgent implementation of targeted interventions and policy measures (10). In the early 2000s, the American Association of Critical-Care Nurses (AACN), confronted with challenges related to nursing shortages and attrition, launched a major national initiative that included extensive research aimed at identifying the core components of healthy work environments. This initiative led to the development and validation of the Healthy Work Environment Assessment Tool (HWEAT) and, in 2005, the issuance of national standards for establishing and sustaining HWEs (11). These standards comprise six essential elements that are fundamental to achieving and maintaining a healthy work environment: skilled communication, true collaboration, effective decision-making, appropriate staffing, meaningful recognition, and authentic leadership (12). Since 2006, AACN has conducted multiple large-scale surveys assessing the implementation and impact of these six standards using the HWEAT tool. Data collected before, during, and after the implementation phases revealed encouraging findings, particularly among intensive care units (ICU) nurses, with measurable improvements in outcomes for both patients and staff (13,14). These results are corroborated by a comprehensive systematic review by Wei et al., which identified positive associations between healthy work environments and patient outcomes, including survival and other key quality indicators (15). While numerous studies have been conducted in Europe on healthy work environments using various survey instruments, the adoption of the HWEAT tool has gained momentum in recent years and is being increasingly applied in European research (3,8,16,17).

NATIONAL CONTEXT OF THE STUDY

In response to the challenges faced by European countries and to gain insight into the work environment of intensive care nurses, the authors designed and implemented an Erasmus+ project, which ran from 2019 to 2022 (18). The project involved five participating countries: Cyprus, Croatia, Spain, Poland, and Romania. As part of this project, a cross-sectional study was conducted on the perceptions of healthy work environments among intensive care nurses—forming the basis of the present article. Considering the time-based and contextual framework of the study, it is essential to note that the participating countries, like the global community, were simultaneously grappling with the impact of the COVID-19 pandemic. This unprecedented health crisis exposed systemic vulnerabilities in hospital infrastructure and healthcare delivery, placing extraordinary demands on intensive care nurses. Moreover, during the study period, Croatia was struck by two devastating earthquakes that resulted in the loss of human lives. These concurrent crises represent significant contextual factors that must be considered when interpreting the study's findings and comparing them to those from other

research conducted under different conditions or at different times. This article presents the main results and key findings of that study, focusing on the perceptions and experiences of critical care nurses in Croatia, assessed using the HWEAT tool.

METHODS

STUDY DESIGN

A quantitative cross-sectional study was carried out using a self-administered questionnaire HWEAT, distributed to ICU nurses in Croatia.

PARTICIPANTS AND DATA COLLECTION

The study employed a convenience sampling method, targeting all registered nurses working in adult ICU across Croatia. Nurses employed outside of intensive care units were excluded. Due to the lack of precise data on the total number of ICU nurses who met the inclusion criteria, it was not possible to determine an exact survey denominator. Consequently, the recruitment strategy focused on obtaining the largest possible sample of eligible ICU nurses. Data collection was conducted between January 2021 and April 2022 using the Qualtrics software platform. For digital distribution, researchers contacted ICU nurses through their institutional email addresses. Additionally, the National Association of Critical Care Nurses in Croatia assisted in disseminating the survey among its members.

SURVEY INSTRUMENT

The study employed the HWEAT, developed by the AACN. The instrument is based on the Critical Elements of a Healthy Work Environment Scale, which was used in the 2018 National Survey of Critical-Care Nurse Work Environments (version 1).

Following permission from the AACN, the survey was translated into Croatian. The research team conducted the translation and back-translation processes and performed pilot testing with 30 ICU nurses to ensure clarity and comprehension of the survey items (Cronbach's alpha of 0.97) (12). The survey is self-administered and structured around the six AACN standards for fostering and sustaining a healthy work environment. It comprises four sections: Section A assesses the quality of care provided and participants' familiarity with the AACN standards. Section B evaluates the critical elements of a healthy work environment using the HWEAT, which includes 16 items rated on a 4-point Likert scale. This section captures perceptions at both the institutional and unit levels. Section C explores aspects such as staffing adequacy, moral distress, organizational support for nurse health and safety, workload capacity, job satisfaction, turnover intentions, and factors

influencing decisions to remain in the current role. Section D collects demographic data. With AACN approval, Sections A and C were adapted to better reflect the European nursing context. Section B, which includes the Critical Elements of a Healthy Work Environment Scale (CEHWES), remained unchanged.

DATA ANALYSIS

Data analysis was conducted using R (version 4.1.0; R Core Team, 2021) and SPSS (version 26 for Windows). Descriptive statistics were used to assess the state of critical care nurses' work environments across the six AACN subscales. Mean scores for each standard were calculated according to AACN guidelines (13). As completion of the entire questionnaire was not mandatory, response rates varied by question. Participants were excluded from the analysis based on the following missing data criteria: (a) those who completed only Section A without responding to subsequent sections, and (b) those with more than 10% missing responses in Sections B, C, or D. No data imputation techniques were employed to address missing values. Associations between healthy work environment indicators, demographic variables, and outcomes were examined using chi-square tests, t-tests, and one-way analysis of variance (ANOVA). A significance level of $p < 0.05$ was used.

ETHICAL CONSIDERATION

Ethical approval for the study was granted by the Cyprus Bioethical Committee, as Cyprus served as the lead coordinating country

for the Erasmus + project. Participants were informed about the study's objectives through an accompanying information letter, and their completion of the survey was taken as consent to participate. Survey was anonymous, and participants could withdraw at any time. Responses were verified and entered a database by the principal investigator from Croatia. To prevent multiple submissions, participants were instructed to create a unique alphanumeric code. The database was overseen by an independent statistician, not involved in the research team, who was responsible for data cleaning, analysis, and reporting. This process helped ensure consistency in data coding, cleaning, and comparative analysis.

RESULTS

277 intensive care nurses from Croatia participated in the study. The total number of participants was 277; however, for each section, the number of respondents corresponds to the number of fully completed sections. These participants represent a sample from more than 10 hospitals in Croatia that have intensive care unit. Demographic results showed that a higher proportion of female, 172 (62%), then male, participated in study. The average work experience in nursing was 11.3 years, and in the ICU, it was 9.3 years. Most respondents were bedside nurses (214, 77%) and had a bachelor's degree (139, 50%) (Table 1).

Table 1. Demographic characteristics of the sample

Gender [n(%)] (n=277)	Male	62 (22)
	Female	172 (62)
	Prefer not to answer	19 (6.9)
What is the highest degree you have received? [n(%)] (n=277)	Diploma in Nursing	76 (27)
	Bachelor's Degree	139 (50)
	Master's Degree in Nursing	36 (13)
	Doctoral Degree in nursing	2 (0.7)
	Missing	24 (8.7)
Years of total nursing experience (mean)		11.3 (9.9)
Years of nursing experience in critical/intensive care unit (mean)		9.3 (8.9)
Current position [n(%)] (n=277)	Unit Manager	27 (9.7)
	Bed Side Nurse	214 (77)
	Unit Educator	2 (0.7)
	Other (please specify)	10 (3.6)
	Missing	24 (8.7)

OVERALL PERCEPTION OF JOB SATISFACTION AND WORK ENVIRONMENT

A total of 277 registered nurses participated in the study. Regarding overall job satisfaction, more than half of the respondents 159 (57%) reported being somewhat satisfied with their role as a nurse, while 82 (30%) indicated they were very satisfied. A smaller proportion of participants reported being somewhat dissatisfied 24 (8.7%) or very dissatisfied 12 (4.3%). The mean job satisfaction score was 3.1 (SD = 0.7) on a 4-point Likert scale, indicating a generally moderate to high level of satisfaction (Table 2).

Most nurses 183 (66%) reported being aware of the Healthy Work Environment (HWE) Standards. However, their responses suggest that awareness does not necessarily equate to implementation in practice. Specifically, 102 (37%) nurses reported that the HWE Standards had not at all been implemented in their intensive care unit (ICU), while 85 (31%) nurses were unsure about the implementation status. Only 7 (2.5%) nurses reported that the standards were fully implemented, suggesting a significant gap between awareness and actual practice (Table 2.).

Table 2. Nurse Satisfaction, Awareness, and Implementation of Healthy Work Environment

Independent of your present job, how satisfied are you with being a registered nurse? [n(%)] (n=277)	Very satisfied	82 (30%)
	Somewhat satisfied	159 (57%)
	Somewhat dissatisfied	24 (8.7%)
	Very dissatisfied	12 (4.3%)
	Mean satisfaction (SD)	3.1 (0.7)
Are you aware of any Healthy Work Environment Standards in ICU?	Yes	183 (66)
	Not at all	102 (37)
	Just beginning	47 (17)
Has your unit implemented any Healthy Work Environment Standards? [n(%)] (n=277)	Well on the way	36 (13)
	Fully implemented	7 (2.5)
	Do not know	85 (31)

¹ n (%); Mean (SD) , Mean rating (SD): Mean of scores ranging from 1 (Very dissatisfied) to 4 (Very satisfied)

SKILLED COMMUNICATION AND TRUE COLLABORATION

Out of 257 ICU nurses who fully responded to the section on communication, half of the nurses stated that they have fair communication between colleagues, also with

doctors, with nursing managers and administrative staff. From overall sample, 59 (23%) of them stated that they had poor communication with nursing managers and 95 (37%) had poor communication with administrative staff (Table 3).

Table 3. Perceived Quality of Communication and Collaboration Among ICU Staff

How would you rate the quality of communication in your unit among the following?			How would you rate the quality of collaboration in your unit among the following?		
Communication between Nurses	Croatia, N = 257 ¹	P-value ²	Collaboration between Nurses	Croatia, N = 257 ¹	P-value ²
Excellent	25 (9.7%)	<0.001	Excellent	39 (15%)	<0.001
Good	89 (35%)		Good	103 (40%)	
Fair	118 (46%)		Fair	103 (40%)	
Poor	25 (9.7%)		Poor	12 (4.7%)	
Communication between nurses and Physicians			Collaboration between nurses and Physicians		
Excellent	19 (7,4%)		Excellent	24 (9,3 %)	
Good	65 (25%)		Good	76 (30%)	
Fair	129 (50%)		Fair	132 (51%)	
Poor	44 (17%)		Poor	25 (9,7%)	
Communication between Nurses and unit Nursing Managers			Collaboration between Nurses and unit Nursing Managers		
Excellent	24 (9,3%)		Excellent	28 (11%)	
Good	67 (26%)		Good	66 (26%)	
Fair	107 (42%)		Fair	119 (46%)	
Poor	59 (23%)		Poor	44 (17%)	
Communication between Nurses and Hospital Administration			Collaboration between Nurses and Hospital Administration		
Excellent	10 (3,9)		Excellent	9 (3,5%)	
Good	42 (16%)		Good	45 (18%)	
Fair	110 (43%)		Fair	124 (48%)	
Poor	95 (37%)		Poor	79 (31%)	

¹n (%), ²Pearson's Chi-squared test

MEANINGFUL RECOGNITION

Nurses reported that recognition is most meaningful when it comes from patients and their families 122 (47%) (Figure 1). When assessing levels of respect within the work environment, the following results

were obtained: respect among nurses was rated as fair by 112 (44%) respondents; respect from physicians toward nurses was rated fair by 126 (49%) nurses; and respect from nursing managers was rated fair by 122 (47%) respondents (Table 4).

Table 4. Perceived Respect Toward Nurses from Various Professional Groups in the ICU Setting

In your unit, how would you rate the respect for nurses by each of the following?

Other Nurses	Croatia, N = 257 ¹	P-value ²
Excellent	28 (11%)	<0.001
Good	97 (38%)	
Fair	112 (44%)	
Poor	20 (7,8%)	
Physicians		
Excellent	18 (7,0%)	
Good	68 (26%)	
Fair	126 (49%)	
Poor	45 (18%)	
Other Health Care colleagues		
Excellent	19 (7,4%)	
Good	74 (29%)	
Fair	140 (54%)	
Poor	24 (9,3%)	
Unit Nursing Managers		
Excellent	29 (11%)	
Good	66 (26%)	
Fair	122 (47%)	
Poor	40 (16%)	
Hospital Administration		
Excellent	13 (5.1%)	
Good	43 (17%)	
Fair	131 (51%)	
Poor	70 (27%)	

¹n (%), ²Pearson's Chi-squared test

Meaningful recognition is most meaningful when it comes from:

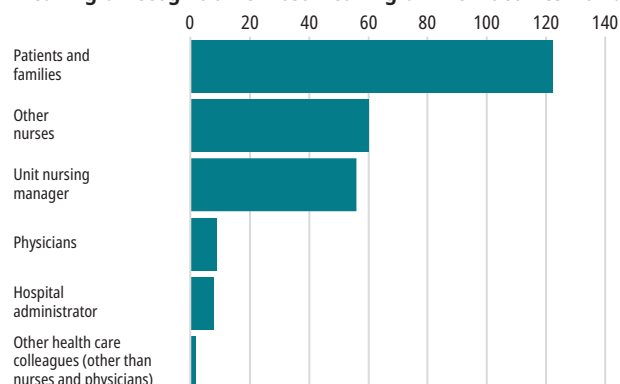


Figure 1. ICU Nurses' Perceptions of the Most Valued Source of Recognition

EFFECTIVE DECISION - MAKING

Nurses have rated their opportunities to influence decisions that affect the quality of patient care in their unit as higher (3.9 (0.7) – strongly agree), while they lack recognition of other values to the work of the organization in the unit (3.4 (0.7) – agree) (Table 5).

Table 5. Nurses' opportunities to influence decisions

Nurses are valued and committed partners in making policy, directing, and evaluating clinical care, and leading organizational operations. - In your work unit		
N= 277 ¹	3.5 (0.8)	<0.001 P-value ²
Nurses have opportunities to influence decisions that affect the quality of patient care. - In your work unit		
N=277 ¹	3.9 (0.7)	<0.001 P-value ²
Nurses recognize others for the value they bring to the work of the organization. - In your work unit		
N=277 ¹	3.4 (0.7)	<0.001 P-value ²

¹ Mean (SD) / Mean of scores ranging from 1 (strongly disagree) to 4 (strongly agree); a higher score indicates a higher level of of the AACN standard.

² One-way ANOVA

APPROPRIATE STAFFING

Appropriate staffing is a major and growing concern in Croatia with only 9 (3.5%) nurses responding that there is the right number of nurses with the right knowledge and skills all the time (Table 6) (19). 103 (40%) nurses reported having appropriate staffing between 25-49% of the time (Table 6). In relation to statements about the insufficient number of nurses, at the end of the shift 88 (35%) nurses stated that they did 100% of the assigned work (medications, procedures, monitoring etc.), and 50 (19%) nurses stated that they only did less than 25% of the assigned work (Table 6).

Table 6. Nurses' Perceptions of Staffing Levels and Task Completion

	Croatia, N = 257 ¹	<0.001	p-value ²
Regarding staffing for your unit how often do you have the right number of nurses with the right knowledge and skills?	Less than 25% of the time		50 (19%)
	Between 25-49% of the time		103 (40%)
	50-75% of the time		70 (27%)
	More than 75% of the time		25 (9.7%)
	All the time		9 (3.5%)
	Croatia, N = 257 ¹	<0.001	p-value ²
At the end of a typical shift, to what degree do you get the following work done? Direct care (medications, procedures, monitoring etc.)	0-49% of work done		16 (6.4%)
	50-74% of work done		51 (20%)
	75-99% of work done		95 (38%)
	100% of work done		88 (35%)
	(Not applicable)		7

AUTHENTIC LEADERSHIP

Participants indicated that nurses in leadership roles demonstrate a strong commitment 3.5 (0.8) and the same assessment to the principles of healthy work environment and actively involve others in the process of fostering and maintaining such an environment (20,21) (Table 7). When

rating the competencies of their nurse leader, 46 (18%) nurses reported poor communication skills, while 87 rated communications as fair (34%). Additionally, 69 (27%) nurses indicated that their nurse leaders do not ensure adequate staffing levels, and 59 (23%) perceived the quality of leadership as poor (Table 7).

Table 7. Nurses' Evaluation of Nurse Leaders' Commitment and Skills Related to Healthy Work Environment Standards

Nurse leaders (formal and informal) fully embrace the concept of a healthy work environment. - In your work unit	Croatia, N = 2771	3.5 (0.8)	<0.001 p-value²		
Nurse leaders (formal and informal) engage others in achieving a healthy work environment. - In your work unit	Croatia, N = 2771	3.5 (0.8)	<0.001 p-value²		
Please rate the skill of your unit Nursing managers in the following areas					
Frontline nursing manager	Croatia N=257¹			p-value²	
Competency	Excellent	Good	Fair	Poor	<0.001
Communication	54 (21%)	70 (27%)	87 (34%)	46 (18%)	
Collaboration	54 (21%)	89 (35%)	82 (32%)	32 (12%)	
Providing Staff resources	38 (15%)	58 (23%)	92 (36%)	69 (27%)	
Providing Supplies, Equipment, and other non-human resources	71 (28%)	85 (33%)	80 (31%)	21 (8.2%)	
Effective decision making	52 (20%)	83 (32%)	80 (31%)	42 (16%)	
Recognition of others’ contributions	50 (19%)	59 (23%)	92 (36%)	56 (22%)	
Leadership	52 (20%)	83 (32%)	64 (25%)	58 (23%)	
Ensuring the provision of high-quality patient care	72 (28%)	92 (36%)	81 (32%)	12 (4.7%)	
Promoting a professional practice environment	54 (21%)	75 (29%)	81 (32%)	47 (18%)	
Overall effectiveness	58 (23%)	82 (32%)	91 (35%)	26 (10%)	

¹ n (%), ² Pearson's Chi-squared test

PHYSICAL AND PSYCHOLOGICAL SAFETY

Participants were asked if there is zero-tolerance policy on verbal abuse in their organization. 113 (44%) nurses answered that they do not know; for physical abuse, 104 (40%) nurses do not know if there is zero tolerance (Table 8) (22). Nurses

were asked if they had some incidents (verbal or physical) at work in the last year, and more than half nurses stated that they have experienced some form of abuse, 145 (56%) (Table 9). In 48% of reported incidents, there was some discussion, but nothing was done or there was no follow-up (Table 9).

Table 8. Awareness of Zero Tolerance Policies on Verbal and Physical Abuse Among Nurses

Does your organization have a zero-tolerance policy on verbal/ physical abuse?			
Croatia, N = 257 ¹	Yes	No	Don't know
Does your organization have a zero-tolerance policy on verbal abuse?	85 (33%)	59 (23%)	113 (44%)
Does your organization have a zero-tolerance policy on physical abuse?	128 (50%)	25 (9.7%)	104 (40%)

¹ n (%),

² Pearson's Chi-squared test

Table 9. Proportion of nurses reporting at least one incident of abuse in the past year

At least one incident (Harassment/ Discrimination/ Verbal or Physical Abuse) 145 (56%)					
Croatia, N = 257 ¹					
Number of incidents of abuse in the past year - by Type and Perpetrator - Croatia					
Perpetrator	Discrimination	Harassment	Physical abuse	Verbal abuse	Total
A nurse manager	593	0	19	590	1.202
Another nurse	180	11	16	952	1.159
Patients	178	24	100	850	1.152
A physician	246	21	12	400	679
Patients' families	81	8	4	336	429
Other health care personnel	63	0	0	364	427
An administrator	27	0	0	62	89

SATISFACTION WITH NURSING, CURRENT POSITION AND CAREER PLANS

152 (59%) participants reported that they are somewhat satisfied with their current job. 18 (7%) nurses are very dissatisfied and mean satisfaction is 3 (0.8%), which gives us information that ICU nurses are satisfied with their current job in general (Table 10).

Table 10. Overall Job Satisfaction Among Nurses

		Croatia, N = 257 ¹	<0.001 p-value ²
Overall, how satisfied are you with your current job?	Very satisfied	62 (24%)	
	Somewhat satisfied	152 (59%)	
	Somewhat dissatisfied	25 (9.7%)	
	Very dissatisfied	18 (7.0%)	
	Mean satisfaction (SD)	3.0 (0.8%)	

¹ n (%); Mean (SD), Mean satisfaction (SD): Mean of scores ranging from 1 (Very dissatisfied) to 4 (Very satisfied),

² Pearson's Chi-squared test; One-way ANOVA

Regarding nurses' intentions to leave their current positions, data from Croatia (N=257) show that most respondents 170 (66%) reported having no plans to leave their current position within the next three years. However, 66 (26%) indicated plans to leave within next years, and 21 (8.2%) expressed intentions to leave within the next 12 months (Table 11).

Table 11. Intentions to Leave Current Nursing Position Among ICU Nurses

		Croatia, N = 257 ¹	<0.001 p-value ²
Do you plan to leave your present 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%)	

¹ n (%),

² Pearson's Chi-squared test

IMPLEMENTATION LEVELS OF AACN STANDARDS AND STAFF PERCEPTION OF SAFETY CULTURE

The mean scores for the implementation of the AACN Healthy Work Environment (HWE) Standards at the unit level indicate moderate levels across all six domains (Table 12). Among 277 nurses, the highest mean score was observed for Meaningful Recognition (M=2.7, SD = 0.7), followed by True Collaboration and Authentic Leadership (M=2.5, SD = 0.6–0.7). Lower scores were reported for Skilled Communication, Effective Decision-Making, and Appropriate Staffing (M=2.4, SD=0.6–0.7). All mean differences were statistically significant (p < 0.001). When evaluating the same standards at the organizational level (Table 13), similar results were obtained. Meaningful Recognition remained the highest-rated domain (M=2.7, SD=0.7), while Skilled Communication, True Collaboration, and Authentic Leadership all received mean ratings of 2.5 (0.6). The lowest scores were again noted in Effective Decision-Making and Appropriate Staffing (M = 2.4), with all differences statistically significant (p < 0.001). Regarding perceived organizational support for employee health and safety, responses from 257 nurses revealed concerning trends. This result was statistically significant (p<0.001) (Table 14).

Table 12. Mean level (SD) of AACN Standards - In the Unit

		Croatia, N=277 ¹	<0.001 p-value ²
Mean level (SD) of AACN Standards - In the Unit	Skilled Communication	2.4 (0.6)	<0.001
	True Collaboration	2.5 (0,6)	<0.001
	Effective Decision-Making	2.4 (0.6)	<0.001
	Appropriate Staffing	2.4 (0.7)	<0.001
	Meaningful Recognition	2.7 (0.7)	
	Authentic Leadership	2.5 (0.7)	<0.001

¹ Mean (SD) / Mean of scores ranging from 1 (strongly disagree) to 4 (strongly agree); a higher score indicates a higher level of of the AACN standard,

² One-way ANOVA

Table 13. Mean level (SD) of AACN Standards - In the Organisation

		Croatia, N = 277 ¹	<0.001 p-value ²
Mean level (SD) of AACN Standards - In the Organisation	Skilled Communication	2.5 (0.6)	<0.001
	True Collaboration	2.5 (0.6)	<0.001
	Effective Decision-Making	2.4 (0.6)	<0.001
	Appropriate Staffing	2.4 (0.7)	<0.001
	Meaningful Recognition	2.7 (0.7)	
	Authentic Leadership	2.5 (0.7)	<0.001

¹ Mean (SD) / Mean of scores ranging from 1 (strongly disagree) to 4 (strongly agree); a higher score indicates a higher level of the AACN standard,

² One-way ANOVA

Table 14. Nurse Perceptions of Organizational Support for Health and Safety

	Croatia, N = 57 ¹	p-value ²
To what degree do you agree with the statement?		
“My organization values my health and safety”		<0.001
Strongly agree	15 (5.8%)	
Agree	81 (32%)	
Disagree	92 (36%)	
Strongly disagree	69 (27%)	
Mean satisfaction (SD)	2.2 (0.9)	<0.001

¹ n (%); Mean (SD) , Mean agreement (SD): Mean of scores ranging from 1 (Strongly Disagree) to 4 (Strongly Agree),

² Pearson's Chi-squared test; One-way ANOVA

DISCUSSION

This comparative analysis aims to contextualize the perceptions of Croatian ICU nurses within the broader international landscape, offering insights into common challenges and strengths across different healthcare systems. The findings of this study provide important insight into the state of communication and collaboration within Croatian intensive care units and allow for meaningful comparison with international data, particularly from the AACCN surveys conducted between 2018 and 2021 (12). The Croatian data reflect a comparable structure but with generally lower scores. Among the 257 ICU nurses who completed the relevant section, approximately 50% rated communication with colleagues and physicians as fair. However, 59 (23%) reported poor communication with nurse managers, and a concerning 95 (37%) indicated poor communication with administrative staff. This is notably worse than in the AACCN findings, suggesting that hierarchical communication in Croatian ICU may be more strained or underdeveloped than in some international settings. When it comes to collaboration, Croatian ICU nurses identified the strongest collaboration with colleagues (presumably above 60%, though precise percentages were not given), followed by nurse managers, physicians, and, lastly, administrative staff—again matching the AACCN ranking order. However, the depth of dissatisfaction in the Croatian context appears more pronounced. For instance, the combined group reporting either poor or only fair communication with administration exceeds 70%, highlighting a critical weakness in vertical communication and engagement. A comparative look at the findings from Poland provides additional context for interpreting the results of the current study. In the 2022 cross-sectional study involving 226 ICU nurses from the Warmia and Mazury region, the mean agreement score for Skilled Communication was reported at 2.7 (SD = 0.60) (23). On the other hand, Polish nurses in the present sample (n = 87) reported a slightly lower average of 2.5 (SD = 0.60). One possible explanation for this discrepancy could be the time elapsed since the peak of the COVID-19 pandemic, as communication dynamics and staff priorities may have shifted during recovery periods. A 2017 study of 50 ICU nurses in Poland found that 75% believed their care was not patient-centered, largely due to insufficient communication-related training and skills (23). Consistent with these earlier findings, the current study revealed that Polish nurses gave the lowest ratings to Skilled Communication—averaging just 2.2 (SD = 0.8) at the unit level—suggesting that progress in this area remains limited.

This study highlights notable discrepancies between Croatian ICU nurses' perceptions of meaningful recognition and those reported in international literature, particularly in the AACCN survey (12). While nurses globally consistently identify recognition from patients and families as the most meaningful—reported by 39% in the AACCN study—Croatian ICU nurses demonstrated an even stronger preference, with 47% indicating that recognition from patients and families is most valued. This suggests that, in the Croatian context,

external validation from care recipients holds a particularly central role, potentially compensating for the perceived lack of formal or institutional recognition.

When asked to rate the level of respect nurses receive from different professional roles within the hospital, most Croatian respondents consistently selected “fair” as the dominant rating. For instance, 44% of Croatian ICU nurses rated respect from other nurses as “fair,” and only 11% rated it as “excellent.” Similarly, respect from physicians was rated as “fair” by 49%, with only 7% rating it “excellent” and 18% rating it as “poor.” Respect from nursing managers followed a comparable trend, with 47% rating it as “fair” and 16% as “poor.” The lowest recognition scores were associated with hospital administration: 51% of nurses rated respect from administrators as “fair,” and a concerning 27% rated it “poor.” These findings suggest a widespread lack of perceived professional respect from leadership and interdisciplinary colleagues. This contrasts with international findings that show a strong positive correlation between perceived recognition and job satisfaction. In the AACN study, a significant positive correlation was found between agreement with the statement “nurses are recognized for the value each brings to work of the organization” and job satisfaction ($r = .52, p < .01$). Moreover, 53% of nurses who strongly agreed with that statement indicated no intent to leave their current position, suggesting that recognition plays a protective role against turnover.

The current study shows that ICU nurses in Croatia perceive relatively strong opportunities to influence decisions that directly impact the quality of patient care in their units, with a high mean score of 3.9 ($SD = 0.7$) on a scale from 1 (strongly disagree) to 4 (strongly agree). This suggests a positive perception of their involvement in bedside and clinical-level decision-making. However, when it comes to broader organizational engagement, Croatian nurses report lower agreement. The statement “Nurses are valued and committed partners in making policy, directing, and evaluating clinical care, and leading organizational operations” received a mean score of 3.5 ($SD = 0.8$), while “Nurses recognize others for the value they bring to work of the organization” was rated even lower, at 3.4 ($SD = 0.7$). These findings indicate a gap between perceived clinical autonomy and strategic or leadership-level involvement, where nurses may feel less recognized or integrated as full partners. The reduction in nurses’ engagement in policy-making and organizational leadership roles was particularly emphasized, raising alarms about the systemic underutilization of nurses’ voices in shaping patient care at higher decision-making levels. In this context, Croatian nurses appear to report somewhat more favorable perceptions regarding their involvement in clinical decisions than their international counterparts in the most recent AACN study. However, like the global findings, they express dissatisfaction with their recognition as valued organizational partners. This suggests a shared, ongoing challenge in effectively integrating nurses—not just in direct care decisions—but in shaping broader institutional policies and strategies. Neglecting to include bedside nurses in such

processes risks diminishing the relevance and practicality of organizational decisions, especially in critical care, where nurses provide 24/7 patient oversight. Moreover, exclusion from decision-making can negatively impact morale, professional identity, and retention.

Appropriate staffing continues to be a critical concern in ICU settings worldwide, and the results of this study reflect that this issue is particularly pronounced in Croatia. Alarming, only 3.5% of Croatian ICU nurses reported that they “always” have the right number of nurses with the right mix of skills and knowledge to meet patients’ needs. Additionally, 40% indicated that appropriate staffing was achieved only 25–49% of the time, underscoring a chronic mismatch between patient care demands and available nursing resources. These findings are even more concerning when considered alongside the 19% of nurses who reported completing less than 25% of their assigned clinical tasks by the end of a typical shift, despite the average perception score of 3.8 ($SD = 0.9$) for the item “Nurses staffing ensures the effective match between patient needs and nurse competencies.” When compared to international data—particularly from the AACN 2022 study—the Croatian results suggest a shared global crisis, though with certain local nuances (12). The AACN survey found that staffing received the lowest rating of all AACN elements, not just in the 2021 cycle, but across all five previous survey rounds, including 2006, during the last major nursing shortage. In that study, only 24% of nurses reported having appropriate staffing levels more than 75% of the time, a proportion notably higher than the 13.2% (combining “more than 75%” and “all the time”) reported by Croatian nurses. Pandemic-related disruptions have exacerbated the global staffing crisis, contributing to increased workloads, the departure of experienced nurses, and reliance on less experienced or temporary staff. However, as in other countries, evidence suggests that staffing issues in Croatian ICU preceded the pandemic and have since worsened. Furthermore, a body of international research has shown clear links between inappropriate staffing and negative patient outcomes, including increased risk of 30-day mortality, longer hospital stays, and higher readmission rates. A prospective study cited in the AACN literature even demonstrated that the cost of hiring additional nursing staff was less than half the amount saved by reducing the average length of stay—suggesting that under-resourcing is not only clinically dangerous but economically inefficient. In Croatia, these systemic failures have contributed to a steady outflow of nursing staff, particularly from ICUs.

In the present study conducted among Croatian ICU nurses, leadership was evaluated through both standardized AACN items and practical assessments of frontline nurse managers’ competencies. Participants reported moderate to high agreement with the AACN-based statements, with mean scores of 3.5 ($SD = 0.8$) for both “Nurse leaders fully embrace the concept of a healthy work environment” and “Nurse leaders engage others in achieving it.” These ratings reflect a generally positive perception of leadership intent and engagement,

suggesting that many Croatian ICU nurses recognize their leaders' efforts to promote professional practice environments. However, the more detailed evaluation of frontline nurse managers' competencies revealed several concerns. While a notable proportion of respondents rated certain competencies as excellent—such as ensuring high-quality care (28%) and resource provision (28%)—a significant number assigned fair or poor ratings across critical leadership dimensions. For instance, 18% of nurses rated nurse manager communication as poor, and 27% felt their nurse managers failed to ensure adequate staffing. Similarly, 23% of participants perceived overall leadership quality as poor. These figures point to variability in leadership effectiveness and possibly reflect inconsistent leadership development or support across healthcare institutions. When compared with data from the ACCN 2022 study, which highlighted strong correlations between nurse manager effectiveness and multiple components of the work environment (e.g., recognition: $r = .60$; shared decision-making: $r = .51$; job satisfaction: $r = .49$) (12), Croatian findings suggest both parallels and divergences. The relatively high scores on commitment to healthy environments contrast with the substantial percentage of nurses reporting deficits in core leadership functions. This gap may be explained by limited leadership training, role overload, or insufficient institutional authority among nurse managers. Inadequate staffing and weak communication—both of which were cited as problematic—are not only operational issues but also symptoms of strained leadership capacity. Overall, the Croatian data echo global concerns about the need to invest in authentic leadership development. Strengthening nurse managers' competencies, empowering them with decision-making authority, and creating feedback-rich cultures could bridge the gap between leadership intent and impact.

Findings from the present Croatian study highlight concerning gaps in these domains. More than half of the participating ICU nurses in Croatia (56%) reported experiencing at least one form of abuse—verbal, physical, discriminatory, or harassment—within the past year. Verbal abuse was overwhelmingly the most common form, with nurse managers, other nurses, and patients identified as the most frequent perpetrators. These results reflect a deeply troubling workplace dynamic, particularly considering that only 33% of nurses were aware of a zero-tolerance policy on verbal abuse and 50% on physical abuse, while 44% and 40%, respectively, stated they were unaware of such policies altogether. The high rate of abuse incidents reported by Croatian nurses aligns with international findings. For instance, a large-scale U.S. survey recorded over 216,000 incidents of abuse in one year among 7,399 nurses, with verbal and physical abuse most often perpetrated by patients and their families (12,24,25). However, a notable divergence in the Croatian context is the frequency with which nurse managers and fellow nurses were identified as sources of abuse, which may signal a more profound issue related to intra-professional conflict and hierarchical pressure within units. Compounding this issue, 48% of Croatian nurses who reported an incident indicated that while some discussion occurred, no follow-up

or resolution was achieved. This lack of institutional response not only perpetuates psychological unsafety but likely erodes trust in organizational systems. Furthermore, psychological safety is strongly tied to perceived organizational support. Croatian healthcare institutions must urgently address the gap between policy and practice regarding abuse prevention and staff safety. This includes raising awareness about existing zero-tolerance policies, ensuring timely and meaningful follow-up when incidents occur, and promoting open communication channels without fear of retribution. Equally important is fostering a culture where nurse managers are trained not only in leadership and communication but also in cultivating psychologically safe environments.

Findings from the Croatian sample ($N = 257$) indicate that most ICU nurses were generally satisfied with their current job roles. Specifically, 59% reported being somewhat satisfied, while 24% indicated they were very satisfied. However, a non-negligible portion reported dissatisfaction, with 9.7% being somewhat dissatisfied and 7% very dissatisfied. The mean satisfaction score was 3.0 ($SD = 0.8$) on a scale from 1 (very dissatisfied) to 4 (very satisfied), indicating moderate satisfaction overall. Despite moderate levels of job satisfaction, a notable proportion of nurses indicated intentions to leave their current positions soon. 66% of Croatian nurses reported no plans to leave within the next three years. However, 26% planned to leave within three years, and 8.2% intended to leave within the next 12 months. Although these rates suggest a relatively stable workforce compared to other studies, the presence of nearly one-third of staff considering departure within a short to medium term timeframe signals potential risks to workforce retention. Factors that might influence them to reconsider leaving, higher salary and benefits emerged as the most powerful motivator, with 86% identifying it as very or somewhat likely to influence their decision. Other highly influential factors included better staffing levels (78%), opportunities for professional development (75%), better leadership (70%), and more meaningful recognition (70%). While intrinsic motivators such as respect from management and professional autonomy were also important, they ranked slightly lower. These patterns are consistent with international data. A 2021 study cited in a comparable U.S. cohort found that 20% of nurses planned to leave within six months, with another 16% in the 7–12-month period and 31% within three years—an overall higher rate of turnover intent compared to Croatian nurses (25). The same study reported higher salary, better staffing, and more respect from administration as top retention factors, which align closely with Croatian findings. Importantly, Croatian nurses also identified positive current retention factors, including salary and benefits (64%), relationships with coworkers (34%), and patient care (20%). Interestingly, variables such as work environment, opportunities for advancement, and managerial support were infrequently mentioned, suggesting potential areas for organizational improvement. These results collectively underscore a dual reality: while many Croatian nurses currently feel moderately satisfied and intend to remain in their roles, a significant number are vulnerable to leaving if key extrinsic and intrinsic needs are not addressed—particularly in terms of

financial incentives, staffing adequacy, and leadership quality. Notably, these motivators closely align with findings from a large European study in which ICU nurses in Spain, Cyprus, and Poland cited similar priorities. For instance, 87% of those intending to leave cited salary and benefits as a key factor for reconsideration, followed by better staffing (85%), recognition of contributions (82%), and professional development (82%). The link between job satisfaction and turnover intention was also clearly evident. In the European sample, 92% of nurses with no intention to leave were satisfied with their current role, compared to 65% of those who were considering leaving—a pattern mirrored in the Croatian sample (8). Findings from the Croatian ICU nurse sample (N = 257) indicate moderate job satisfaction and relatively stable short-term retention intentions. Specifically, 59% of nurses reported being somewhat satisfied with their current job, while 24% were very satisfied. However, 9.7% were somewhat dissatisfied, and 7% reported being very dissatisfied. The mean satisfaction score was 3.0 (SD = 0.8) on a scale of 1 (very dissatisfied) to 4 (very satisfied), indicating a generally moderate level of satisfaction. Despite this, nearly one-third of the nurses indicated an intention to leave their current position within the next three years—26% within three years and 8.2% within the next 12 months. While these rates suggest a relatively stable workforce compared to some international data, they still signal significant risks to workforce retention and highlight the importance of addressing the underlying factors influencing turnover intent.

LIMITATIONS

Several limitations should be acknowledged in the interpretation of this study's findings. First, the use of an online survey format may have limited participation, particularly among clinicians with restricted internet access or limited digital literacy. Additionally, data collection occurred during the COVID-19 pandemic, a period marked by significant strain on healthcare systems, which may have influenced participants' perceptions and responses regarding their work environment. Selection bias is also a potential concern, as participants were recruited via email invitations and through professional associations, rather than selected through random sampling. As such, the sample may not be fully representative of the broader nursing population, thereby limiting the generalizability of the results. Furthermore, social desirability bias may have influenced responses, given that participants were aware of the study's aim and were directly invited by the researchers. Data completeness was also a limitation, with some responses missing—particularly toward the end of the survey. This may be attributed to survey length or respondent fatigue. The placement of demographic questions at the end could have contributed to the incomplete data, making it difficult to determine whether systematic differences existed between respondents with full and partial responses.

CONCLUSIONS

The findings suggest that while certain foundational elements of a supportive work environment are present, systemic deficits persist—particularly in areas essential for workforce sustainability and quality patient care. There is certain need for optimisation of:

- Skilled Communication
- True Collaboration
- Meaningful Recognition
- Adequate staffing.

Lack of internal recognition may contribute to diminished job satisfaction and increased turnover intention. With respect to Effective Decision-Making, Croatian ICU nurses expressed relatively high perceived influence over clinical care decisions; however, they reported markedly lower involvement in broader organizational policymaking and leadership processes. Finally, the domain of Physical and Psychological Safety was marked by high rates of reported verbal and physical abuse, including from nurse managers and colleagues. This intra-professional dynamic, coupled with limited awareness of zero-tolerance policies and ineffective institutional follow-up, signals a pressing need for comprehensive strategies to cultivate psychologically safe and respectful clinical environments.

Taken together, these findings situate the Croatian ICU work environment within a broader international context of shared challenges, while also highlighting context-specific issues that demand tailored policy and practice interventions. Targeted investments in staffing infrastructure, leadership training, formal recognition systems, and psychological safety protocols are essential to fostering healthier work environments, improving nurse retention, and ultimately enhancing patient outcomes.

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AI-ASSISTED EDITING DISCLOSURE:

ChatGPT (OpenAI) was used to support grammar and language editing. No content was generated by AI, and all scientific claims and interpretations were written and verified solely by the authors.

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