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Intensive Care Unit Nurses' Perceptions of Work Environments: A Cross-Sectional Study From Five European Counties

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ABSTRACT

Aim: To explore intensive care nurses' perceptions of their work environments at the unit and organisational levels according to the American Association of Critical Care Nurses standards, their impact on care quality, national differences, and demographic associations.

Design: Cross-sectional study using a survey design.

Methods: Study conducted between January 2021 and April 2022, using a convenience sample of intensive care unit nurses across Cyprus, Spain, Croatia, and Poland, Romania. The Critical Elements of a Healthy Work Environment Scale (CEHWES) developed by the American Association of Critical Care Nurses and cross-culturally adapted by the authors was used, which included four sections, including sociodemographic data and a total of 50 questions. The core section of the tool comprised 16 questions using Likert-type response (1—strongly disagree—4 strongly agree). Perception of fulfilment of healthy work environment standards was calculated using the aforementioned Likert-type scale.

Results: A total of 1183 nurses participated reporting moderate perception of fulfilment of the standards, with mean scores ranging from 2.6 to 2.8. Skilled communication and effective decision making were the highest rated. 56% ($n = 662$) reported awareness of some standards and while 25.8% ($n = 305$) reported full or significant implementation in their unit. Significant differences related to the perception of all standards were observed across countries. Implementation of the standards was significantly associated with higher quality of care having better perception when standards were fully implemented.

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Conclusions: This study shows moderate perception of healthy work environment standards among intensive care nurses. Country differences highlight the need for more awareness, training, and further implementation of the standards, which is linked to better care quality.
Implications for the Profession: Work environment still need to improve and needs to be prioritised by organisations, considering local and national particularities. Having a measuring tool available in multiple languages facilitates comparisons and getting a global picture.
Impact: The questionnaire used is validated in different languages, allowing results to be compared with other countries. Novel data from countries that were poorly investigated is now available. More evidence points out the need to prioritise work environment for maintaining quality in patient care.
Reporting Method: The study has been reported following the STROBE checklist.
Patient or Public Contribution: This study did not include patient or public involvement in its design, conduct, or reporting.

1 | Introduction

The need for critical care services has grown substantially, and the recruitment and retention of trained critical care professionals is identified as a global challenge for healthcare organisations (Greenley et al. 2024). The reasons for this worldwide crisis are diverse and complex, but key among them are unhealthy work environments due to excessive workload, poor recognition, lack of autonomy, among others (de Vries et al. 2023; Llaurado-Serra et al. 2025; Hamadeh et al. 2025). Research has shown that Healthy Work Environments (HWE) contribute to reducing medical errors, improving communication, and fostering a culture where patient and staff safety is prioritised (Mihdawi et al. 2020). Interventions that aim to provide better environment standards have been associated with improved employee satisfaction, turnover, and average job tenure among ICU nurses (Kester et al. 2021). In addition, HWE has been linked with a lower risk of poor patient outcomes and health-promoting behaviours among nurses and their performance (Cho and Han 2018). Nurses who work in healthier work environments report less burnout, less job dissatisfaction and less intention to leave their organisation (Greenley et al. 2024; Ulrich et al. 2022).

2 | Background

Although the impact of healthy work environments has been acknowledged for years, in essence nothing seems to have changed (Ulrich et al. 2022). Nurses employed in ICUs are still exposed to risk incidence of burnout, which seems to affect their physical and emotional well-being (Quesada-Puga et al. 2024). Additionally, the COVID-19 pandemic confronted ICU nurses with an even greater and unprecedented challenge with a profound psychological impact (Saravanan et al. 2022) and exacerbated long-standing systemic vulnerabilities in the healthcare work environment that are exposing further the fragility of hospitals and healthcare systems (Ulrich et al. 2022). Similarly, 20 years ago, the disagreeable status of the healthcare work environment was implicated in the shortage of nurses. To address this upsetting association, in 2005, the American Association of Critical Care Nurses (AACN) specified the standards necessary to establish and sustain HWE in critical care settings. These standards include skilled communication, true collaboration, effective decision-making, appropriate staffing, meaningful recognition, and authentic leadership (American Association of Critical-Care Nurses 2005).

Since then, several studies in the United States (US) have investigated the adoption of the AACN HWE standards (Ulrich et al. 2022; Ulrich et al. 2019) using the 'Critical Elements of a Healthy Work Environment scale (CEHWES)' that constitute the Healthy Work Environment Assessment Tool (HWEAT) that has been designed and validated by the AACN (American Association of Critical-Care Nurses n.d.). The results of this survey show that units adopting these standards have better nurse and patient outcomes (Ulrich et al. 2022). Overall, the results speak of progress of the work environment; however, it is highlighted that the improvement has stopped and the last report showed a lower perception of HWE (Ulrich et al. 2022). A recent report by the World Health Organisation (Greenley et al. 2024) has highlighted the necessity to address the nursing workforce from multiple perspectives in order to enhance well-being and retention. The report emphasises the importance of implementing supportive working conditions, ensuring adequate staffing, and fostering effective nursing leadership as key strategies to address this issue.

The HWEAT has mainly been used in the US but its applicability in Europe is limited. One study, that took place in Poland and used the HWEAT, investigated the rationing of nursing care in relation to the assessment of work safety and HWE in intensive care units (Antoszewska and Gutysz-Wojnicka 2024). Other studies conducted in Croatia assessed HWE in ICU nurses (Slijepcevic et al. 2025) and analysed the perceptions of abuse and its relation with HWE (Friganović et al. 2024). At the same note, a European project proposed a training intervention based on the AACN standards to facilitate their implementation in ICUs (Georgiou et al. 2023). As part of this initiative, the same team investigated HWEs, their relationship with nurses' intention to leave, the key factors that encourage retention and their relevance with HWE (Llaurado-Serra et al. 2025).

3 | The Study

Due to the limited data outside the US, this study embarked to explore ICU nurses' perceptions of their work environment at

both the unit and organisational levels across five European countries (Cyprus, Spain, Croatia, Poland, Romania). It examined nurses' awareness and implementation of HWE standards, their agreement with these standards, the perceived impact of HWE standards on the quality of patient care, and potential national differences. Additionally, associations between participants' demographics and HWE standards were investigated.

3.1 | Context of the Study

The selection of the participating countries who are located in Southern and Eastern Europe was based on a previous collaboration as part of an Erasmus + project: (Erasmus + KA2 ref. number 2019-1-CY01-KA202-058401: https://erasmus-plus.ec.europa.eu/projects/search/details/2019-1-CY01-KA202-058401). Importantly, during the study period, participating countries were struggling with the COVID-19 pandemic, as was the whole world. This situation exposed the fragility of hospitals and healthcare systems and presented an unprecedented challenge to ICU nurses who were called to overcompensate for the potential lack of HWE (Saravanan et al. 2022; Nikbakht Nasrabadi et al. 2022).

4 | Methods

4.1 | Study Design

A multinational quantitative, cross-sectional study with internal comparisons. The study was reported according to the STrengthening the Reporting of OBservational studies in Epidemiology studies (STROBE) checklist.

4.2 | Participants and Setting

Target population was registered nurses working in adult ICUs in Cyprus, Romania, Poland, Croatia, and Spain. Nurses working in accident and emergency and anaesthesia departments were excluded, as the nature of their work is not comparable to that undertaken in an ICU. Since it was not possible to estimate a survey denominator (number of ICU nurses meeting the inclusion criteria) the recruitment goal was to recruit as large of a sample as possible from the unknown size of the whole population, using a convenience sampling.

4.3 | Data Collection

In each country a head investigator coordinated survey distribution and reminders between January 2021 and April 2022 through Qualtrics software. The distribution of the survey was conducted primarily online, with a printed version also utilised in Romania. With regard to the online distribution of the survey, investigators contacted ICU nurses via e-mail through their institutional accounts. In addition, the national critical care nurses' associations from the participating countries distributed the survey to their members. In the case of the printed version, the investigators themselves distributed the survey to the participating ICUs. Within each ICU, a sealed container was provided in which nurses who wished to participate could deposit completed anonymous questionnaires.

4.4 | Instrument

Data was collected using the "Critical elements of a healthy work environment scale. 2018 National Survey of Critical-Care Nurse Work Environments (CEHWES)". The instrument was published originally in English with a Cronbach's alpha of 0.97 (American Association of Critical-Care Nurses n.d.). Permission was granted to translate the tool to the languages of the participating countries. Each country conducted the translation/back-translation and pilot testing (with 10 ICU nurses in each country) to ensure the comprehension of the items as well as cultural and language adaptation of the items and terms. The reliability (internal consistency) testing of the scale was performed for each translated version and results of Cronbach's alpha ranged from 0.858 (Polish version) to 0.948 (Romanian version) indicating a high internal consistency.

The survey is composed of 4 sections which include (a) 6 open-ended questions to elicit information on quality of care and awareness of the AACN standards; (b) 16 questions related to the critical elements of the HWE standards of the work environment in the participants' unit and organisation using Likert-type statements, with 4-point response options: strongly disagree (1 point), disagree (2 points), agree (3 points), and strongly agree (4 points); (c) 20 questions related to appropriate staffing, moral distress, value that the organisation gives to ICU nurses' health and safety, capacity of getting the work done, job satisfaction, intention to leave and factors to keep working in the current position; (d) 8 questions referring to demographic data such as gender, age and education level and type of ICU. In agreement with the AACCN, we adapted section A and C to better match characteristics of nurses from Europe. No modifications were made in section B which included the CEHWES.

4.5 | Data Analysis

Data analysis was conducted in the R programming language v.4.1.0. Core Team (2021) and SPSS v. 26 for Windows were used. Descriptive statistics were applied to assess the state of the critical care nurse environments in the six subscales, across the five participating countries. The guidelines from the AACN were used to calculate the mean score of each standard (Ulrich et al. 2019). Response rate varied across the questions since it was not compulsory to complete the whole questionnaire. Therefore, participants were excluded from the analysis based on the number of missing values in their responses based on the following guide: (a) participants who completed only Section A and none of the other Sections were excluded from the analysis, (b) on Section B, Section C, and Section D, participants with more than 10% missing values were excluded from the analysis. Data imputation was not used for the replacing of missing values. The relationships between HWE measures, demographic information, and outcomes were explored via chi-square tests of association, Welch

t-test Analysis of Variance (one-way ANOVA) and Spearmen correlation. Significance level was set at $p < 0.05$.

4.6 | Ethical Considerations

Research ethics approval was obtained from the Cyprus Bioethical Committee (CNBC 2020.01.145) as Cyprus was the lead coordinating country of the project.

On the first page of the questionnaire, information of the study was provided, and participants had to specifically give their consent to be able to access the questionnaire. Confidentiality was granted throughout the study. The questionnaire was anonymous, but in order to ensure that each participant only answered once, an alphanumeric code was created by each participant when answering the questionnaire. The only person who could access the raw database and could see the anonymous codes was the statistician, who was not part of the research team. Codes were deleted for the analysis. The database was maintained by the statistician of the survey, who was not part of the research team, and performed data cleaning, analysis, and reporting. This ensured the standardisation of data coding, cleaning, and comparative analysis.

5 | Results

5.1 | Social-Demographic and Professional Characteristics

A total of 1183 ICU nurses from five countries (Cyprus: $n = 226$, Spain: $n = 307$, Croatia: $n = 277$, Poland: $n = 87$, and Romania: $n = 286$) participated in this study. The respondents were predominantly female (61.8%; $n = 731$), with a mean age of 37.3 years (SD = 9.9; range: 32.9–42.4). Regarding education, the majority had a bachelor's degree (34.1%; $n = 403$) or master's degree (24.7%; $n = 292$). Over half (54.6%; $n = 646$) worked in general (mixed) ICUs, and as bedside nurses (75.3%; $n = 891$). The mean nursing experience was 14.1 years (SD = 10.1; range: 11.3–19.9), and the mean ICU experience was 10.8 years (SD = 9.2; range: 7.5–13.8). Statistically significant differences were found between countries regarding participants' background characteristics (Table 1).

5.2 | HWE Standards' Awareness and Implementation

Overall, 56% ($n = 662$) of the participants reported awareness about the implementation of some HWE standards in their ICU, with significant differences across countries ($p < 0.001$). Poland reported the highest awareness (70.1%; $n = 829$) and Spain the lowest (28.7%; $n = 339$). Regarding the implementation of HWE standards, 25.8% ($n = 306$) of participants indicated that their unit was 'well on its way' or 'fully implemented' some HWE standards (Table 2). Significant differences ($p < 0.001$) were also found across countries, with Romania reporting the highest proportion of implementation (53.9%; $n = 154$) and Spain and Poland the lowest (9.4% ($n = 29$) and 11.5% ($n = 10$), respectively). Furthermore, 28.9% ($n = 342$) of participants were unaware of any implemented standards. The implementation in the employing organisation is also presented in Table 2.

5.3 | Agreement Ratings of ICU Nurses' Work Environment on HWE Standards Across Countries

In the total sample, mean agreement scores ranged from 2.6 to 2.8 at the unit level and 2.5 to 2.7 at the organisational level (from a scale from one to four, being one "strongly disagree" and four "strongly agree"). Among the HWE standards, Skilled Communication received the highest agreement (Unit: $M = 2.8$, SD = 0.7; Organisation: $M = 2.7$, SD = 0.7), followed by Effective Decision-Making (Unit: $M = 2.7$, SD = 0.6; Organisation: $M = 2.6$, SD = 0.6), while True Collaboration, Appropriate Staffing, Meaningful Recognition, and Authentic Leadership had the lowest (Unit: $M = 2.6$, SD = 0.7; Organisation: $M = 2.5$, SD = 0.7). At the country level, Romania reported the highest agreement ratings, particularly for Skilled Communication (Unit: $M = 3.1$, SD = 0.7; Organisation: $M = 2.9$, SD = 0.6) and Authentic Leadership (Unit: $M = 3.0$, SD = 0.7; Organisation: $M = 2.9$, SD = 0.7). In contrast, Poland had the lowest agreement scores, with Appropriate Staffing receiving the lowest ratings (Unit: $M = 2.1$, SD = 0.7; Organisation: $M = 1.9$, SD = 0.6). Significant differences were observed between countries ($p < 0.001$) (Table 3). In Supporting Information (Tables S1–S3) results from each item from the questionnaire are presented, including a comparison across countries and a description of the results at a unit and organisational level separately.

5.4 | Evaluation of Quality of Care in Relation to the Implementation of HWE Standards in ICU

An overwhelming majority (80.5%; $n = 952$) of participants rated the quality of patient care in their unit as either Excellent or Good. ICU nurses from Romania reported the highest average rating ($M = 3.2$, SD = 0.8), while Poland reported the lowest rating ($M = 2.9$, SD = 0.8). A significant difference across the countries was found ($p < 0.001$). Implementation of HWE standards was significantly associated with higher ratings of the quality of care ($p < 0.001$). Particularly, in units with 'full implementation' of the standards, 73% ($n = 65$) of participants rated the quality of care as Excellent, compared to 17.4% ($n = 71$) in units where standards were 'not at all' implemented. Conversely, lower ratings (Fair or Poor) were more frequent in units with minimal or no implementation of the standards.

5.5 | Associations of Participants' Social-Demographic and Professional Characteristics With HWE Standards

Weak negative correlations emerged between some of the standards and age, years of nursing experience, and ICU experience. Higher coefficients were found in Effective Decision-Making and Appropriate Staffing, suggesting that, possibly, as age and years of experience increased, scores in the perception of fulfilment of the mentioned standards tended to decrease (rho from −0.14 to −0.17; $p < 0.01$).

TABLE 1 | Participants' socio-demographic characteristics.

Characteristic	Total $N=1183$	Cyprus $N=226$	Spain $N=307$	Croatia $N=277$	Poland $N=87$	Romania $N=286$	p[a]
Gender [*n* (%)]							
Male	204 (17.2)	67 (29.6)	40 (13)	62 (22.4)	7 (8)	28 (9.8%)	<0.001
Female	731 (61.8)	112 (49.6)	189 (61.6)	172 (62.1)	65 (74.7)	193 (67.5%)	
Prefer not to answer	84 (7.1)	14 (6.2)	2 (0.7)	19 (6.9)	3 (3.4)	46 (16.1%)	
Missing	164 (13.9)	33 (14.6)	76 (24.8)	24 (8.7)	12 (13.8)	19 (6.6%)	
Age [mean (SD)]	37.3 (9.9)	34.9 (8.1)	38.8 (10.6)	32.9 (9.8)	42.4 (9.7)	41.1 (8.0)	<0.001
Education [*n* (%)]							
Diploma	291 (24.6)	2 (0.9)	62 (20.2)	76 (27.4)	7 (8)	144 (50.3)	<0.001
Bachelor Degree	403 (34.1)	126 (55.8)	39 (12.7)	139 (50.2)	12 (13.8)	87 (30.4)	
Master's Degree	292 (24.7)	59 (26.1)	120 (39)	36 (13)	53 (61)	24 (8.5)	
Doctoral Degree	17 (1.4)	1 (0.4)	10 (3.3)	2 (0.7)	3 (3.4)	1 (0.3)	
Missing	180 (15.2)	38 (16.8)	76 (24.8)	24 (8.7)	12 (13.8)	30 (10.5)	
Years of total nursing experience [mean (SD)]	14.1 (10.1)	11.8 (8.2)	15.8 (10.6)	11.3 (9.9)	19.9 (12.1)	15.6 (9.1)	<0.001
Years of nursing experience in ICU [mean (SD)]	10.8 (9.2)	7.5 (6.9)	11.9 (9.5)	9.3 (8.9)	13.8 (11.3)	12.7 (9.1)	<0.001
Current position [*n* (%)]							
Unit Manager	75 (6.3)	26 (11.5)	11 (3.6)	27 (9.7)	6 (6.9)	5 (1.7)	<0.001
Bed Side Nurse	891 (75.3)	159 (70.4)	205 (66.8)	214 (77.3)	60 (69)	253 (88.5)	
Unit Educator and other categories	50 (4.3)	7 (3.1)	15 (4.8)	12 (4.3)	9 (10.3)	7 (2.5)	
Missing	167 (14.1)	34 (15)	76 (24.8)	24 (8.7)	12 (13.8)	21 (7.3)	
Type of institution [*n* (%)]							
Public	784 (66.3)	60 (26.5)	143 (46.6)	251 (90.6)	67 (77)	263 (92)	<0.001
Private	57 (4.8)	26 (11.5)	25 (8.1)	0 (0)	6 (6.9)	0 (0)	
Other[b]	68 (5.7)	1 (0.4)	63 (20.5)	2 (0.7)	2 (2.3)	0 (0)	
Missing	274 (23.2)	139 (61.5)	76 (24.8)	24 (8.7)	12 (13.8)	23 (8.0)	

(Continues)

TABLE 1 | (Continued)

Characteristic	Total $N=1183$	Cyprus $N=226$	Spain $N=307$	Croatia $N=277$	Poland $N=87$	Romania $N=286$	p[a]
Type of ICU [*n* (%)]							
General (Mixed)	646 (54.6)	148 (65.5)	164 (53.4)	61 (22)	55 (63.2)	218 (76.2)	< 0.001
Cardio-neuro surgical	285 (24.1)	14 (6.2)	59 (19.2)	158 (57)	17 (19.6)	37 (13)	
Other	77 (6.5)	28 (12.4)	8 (2.6)	34 (12.3)	3 (3.4)	4 (1.4)	
Missing	175 (14.8)	36 (15.9)	76 (24.8)	24 (8.7)	12 (13.8)	27 (9.4)	

[a]Pearson's Chi-squared test; One-way ANOVA.
[b]State-contracted institutions are privately owned and managed but operate under a government contract to provide public healthcare.

Males reported more favourable perceptions of appropriate staffing compared to females in both unit and organisational levels ($p=0.014$ and $p=0.001$, respectively). Nurses without university level education had a higher perception of fulfilment of some of the standards compared to those with a university degree [True Collaboration ($p<0.001$), Appropriate Staffing ($p<0.001$), Authentic Leadership ($p<0.05$) at unit and organisational level and Skilled Communication only at the organisation ($p=0.021$)]. Regarding the current position, similar differences were found among the different roles except for Skilled Communication and Authentic Leadership. Bedside nurses generally rated the perception of the standards higher than unit managers, unit educators, and other categories (Table S4).

Regarding the type of institution, private institutions showed the highest scores in most of the standards, despite not all showing statistical differences. Nurses from State-contracted institutions—which are private but operate under government contracts—had the lowest scores in most standards with statistically significant differences in True Collaboration and Appropriate Staffing ($p<0.01$). Finally, small differences were found according to the type of ICU where Cardio-neuro surgical ICUs consistently showed the highest mean scores across most standards compared to general (mixed) ICUs and other types of ICUs (Table S5).

6 | Discussion

The present study has demonstrated that further improvements are required to ensure the incorporation of HWEs in ICUs. The results provide new evidence from countries that have not been widely researched. Conversely, this constitutes the inaugural multinational study in Europe to investigate HWE in the ICU employing a validated instrument that is presently available in multiple languages [English (American Association of Critical-Care Nurses n.d.), Canadian French (Vincelette and Rochefort 2023) Japanese (Kitayama et al. 2022) and Greek, Polish, Romanian, Croatian, and Spanish (Llaurado-Serra et al. 2025)], facilitating international analysis and comparisons utilising a uniform instrument.

The results obtained in the present study align closely with those reported in previous studies (Ulrich et al. 2022; Antoszewska and Gutysz-Wojnicka 2024; Slijepcevic et al. 2025), underscoring the necessity to redouble efforts to enhance the working environment in ICUs. In a manner consistent with all preceding reports from the United States (Ulrich et al. 2022, 2019) respondents in the present study assigned a higher rating to their unit work environment than to their organisation across all six HWE standards. The results may indicate a heightened level of familiarity with the staff and the procedures within one's unit, and/or a reduced awareness of events occurring outside the unit (Ulrich et al. 2022; Antoszewska and Gutysz-Wojnicka 2024; Slijepcevic et al. 2025).

As demonstrated in previous research, the implementation of HWE standards has been shown to have a positive impact on various aspects of nursing practice and patient care. Specifically, efforts to implement these standards have been found to enhance staff morale and satisfaction, reduce absenteeism and

TABLE 2 | Implementation of HWE standards.

HWE standards implementation* [*n* (%)]	Total *N* = 1183		Cyprus *N* = 226		Spain *N* = 307		Croatia *N* = 277		Poland *N* = 87		Romania *N* = 286	
	Unit	Org	Unit	Org	Unit	Org	Unit	Org	Unit	Org	Unit	Org
Not at all	409 (34.6)	370 (31.3)	61 (27)	51 (22.6)	154 (50.2)	149 (48.5)	102 (36.8)	79 (28.5)	48 (55.2)	48 (55.2)	44 (15.4)	43 (15)
Just beginning	126 (10.7)	119 (10.1)	39 (17.3)	44 (19.5)	9 (2.9)	9 (2.9)	47 (17)	42 (15.2)	12 (13.8)	8 (9.2)	19 (6.6)	16 (5.6)
Well on the way	217 (18.3)	212 (17.9)	59 (26.1)	55 (24.3)	20 (6.5)	14 (4.6)	36 (13)	41 (14.8)	4 (4.6)	5 (5.7)	98 (34.3)	97 (33.9)
Fully implemented	89 (7.5)	88 (7.4)	11 (4.9)	11 (4.9)	9 (2.9)	8 (2.6)	7 (2.5)	6 (2.2)	6 (6.9)	7 (8)	56 (19.6)	56 (19.6)
Do not know	342 (28.9)	394 (33.3)	56 (24.8)	65 (28.8)	115 (37.5)	127 (41.4)	85 (30.7)	109 (39.4)	17 (19.5)	19 (21.8)	69 (24.1)	74 (25.9)

Abbreviations: HWE, Health Work Environment; Org, Organisation.
*All comparisons are statistically significant at p-value < 0.001. p-values were calculated between countries using Pearson's Chi-squared test.

TABLE 3 | Agreement rating of participants' work unit and organisational work environments on HWE standards.

HWE standards* [mean (SD)]	Total *N* = 1183		Cyprus *N* = 226		Spain *N* = 307		Croatia *N* = 277		Poland *N* = 87		Romania *N* = 286	
	Unit	Org	Unit	Org	Unit	Org	Unit	Org	Unit	Org	Unit	Org
Skilled communication (SC)	2.8 (0.7)	2.7 (0.7)	2.8 (0.6)	2.7 (0.7)	2.7 (0.6)	2.6 (0.6)	2.6 (0.6)	2.5 (0.6)	2.5 (0.6)	2.3 (0.6)	3.1 (0.7)	2.9 (0.6)
True collaboration (TC)	2.6 (0.7)	2.5 (0.7)	2.8 (0.6)	2.6 (0.6)	2.3 (0.6)	2.2 (0.6)	2.5 (0.6)	2.5 (0.6)	2.2 (0.6)	2.1 (0.5)	2.9 (0.7)	2.9 (0.7)
Effective decision-making (ED)	2.7 (0.6)	2.6 (0.6)	2.9 (0.5)	2.8 (0.5)	2.6 (0.6)	2.5 (0.6)	2.6 (0.6)	2.6 (0.6)	2.5 (0.5)	2.3 (0.5)	2.9 (0.6)	2.8 (0.6)
Appropriate staffing (AS)	2.6 (0.7)	2.5 (0.7)	2.7 (0.7)	2.6 (0.7)	2.4 (0.6)	2.2 (0.6)	2.6 (0.7)	2.6 (0.7)	2.1 (0.7)	1.9 (0.6)	2.8 (0.7)	2.8 (0.7)
Meaningful recognition (MR)	2.6 (0.7)	2.5 (0.7)	2.7 (0.6)	2.6 (0.6)	2.5 (0.6)	2.4 (0.6)	2.3 (0.7)	2.3 (0.7)	2.4 (0.5)	2.2 (0.4)	2.9 (0.7)	2.8 (0.7)
Authentic leadership (AL)	2.6 (0.7)	2.5 (0.7)	2.7 (0.6)	2.6 (0.6)	2.4 (0.7)	2.3 (0.7)	2.5 (0.7)	2.5 (0.7)	2.4 (0.6)	2.3 (0.6)	3.0 (0.7)	2.9 (0.7)

Note: Mean of scores ranging from 1 (strongly disagree) to 4 (strongly agree); a higher score indicates a higher level of the HWE standards.
Abbreviations: HWE, Health Work Environment; ICU, Intensive Care Unit; Org, Organisation.
*All comparisons are statistically significant at p-value < 0.001. p-values were calculated between countries using One-way ANOVA.

staff turnover, foster a healthy work environment, and improve patient care outcomes (Parker et al. 2025). However, it is imperative to implement this strategy more widely in order to achieve a more substantial effect in the clinical setting (Ulrich et al. 2022, 2019). This would involve engaging a diverse range of stakeholders to address the complex implementation challenges that have been identified (Aiken et al. 2026). With regard to quality of care, 25% of the participants from all countries in the study sample rated the quality of care provided in their ICU as excellent, which is lower than in the U.S. sample in 2021 (Ulrich et al. 2022). However, the implementation of HWE standards had a positive association among participants who rated the quality of care in their unit as excellent ($p \leq 0.001$). This result serves to reinforce the notion that, in an HWE, nurses are able to provide higher quality care to their patients, as has been demonstrated by previous research (Kester et al. 2021).

6.1 | Skilled Communication

The score for this standard is the highest in the present study. However, the difference between the other standards was minimal and aligned with the findings of previous studies (Ulrich et al. 2022; Slijepcevic et al. 2025). However, while the majority of respondents in our study think that ICU nurses have good communication skills, 24.7% believe that communication skills are lacking (Supporting Information File 2). Research indicates that nurses may be reluctant to communicate on emotionally and politically sensitive topics with colleagues due to a perceived lack of support or receptivity from their peers, even in situations where patient safety may be compromised (Friganović et al. 2024; Azoulay et al. 2025; Reeves et al. 2017). A beneficial approach to improving communication strategies in the ICU is to involve nurses themselves in the exploration of their experiences, along with the barriers present in the specific ICU they are employed and/or with specific patient groups that might be more challenging to communicate with (Saravanan et al. 2022; Friganović et al. 2024; Nikbakht Nasrabadi et al. 2022; Xyrichis et al. 2025). Previous studies have evaluated the efficacy of specific communication interventions for interprofessional teams in critical care, demonstrating favorable outcomes for collaborative practice models in the ICU (Azoulay et al. 2025; Reeves et al. 2017; Stiggelbout et al. 2012).

6.2 | True Collaboration

The results evidenced in the present study demonstrated a mean value of 2.6 (SD 0.7), which is slightly lower than the mean value of 2.8 (SD 0.7) reported by Ulrich (Ulrich et al. 2022) over the preceding 15 years. However, it is noteworthy that this finding is encouraging given that the history of professional nursing is relatively recent in Europe compared to the United States. A preceding study undertaken in Romania had previously established a correlation between elevated levels of professional stress and the presence of conflicts with hierarchical superiors, as well as relationships with patients and their families (Cotrau et al. 2019). A recent Cochrane systematic review explored the evidence for interventions to strengthen interprofessional collaboration, identifying three clusters of interventions: team facilitation/coaching, rounds and meetings, and the use of checklists (Reeves et al. 2017). Further research is required on the type of interventions that might improve interprofessional collaboration. This is particularly true in a European context, where clinical practice may differ from that in the United States (Aiken et al. 2026; Azoulay et al. 2025). The FEARLESS ICU project (Xyrichis et al. 2025), which is currently being implemented in ICUs across the United Kingdom, serves as a notable exemplar, with the aspiration that it will be emulated by others.

6.3 | Effective Decision-Making

Mean ratings of all elements for this standard in our sample, although lower, were within the same range with the American sample until the decline observed in the U.S. in 2021 in all elements related to decision-making (Ulrich et al. 2022). In some of the elements of this standard, the ratings were lower for Spain, Croatia, Poland (Supporting Information File 1). Findings from these three countries are disconcerting given that patient involvement in decision-making is considered the norm for ethical clinical practice (Aiken et al. 2026). We cannot be certain whether nurses' assessments depict narrow patients' attitudes regarding their role in decision-making or the lack of appropriate training for healthcare professionals in Europe. Yet, shared decision-making is recommended by critical care organisations, and the involvement of nurses in decision making has been advocated since 2011 (Davidson et al. 2017).

6.4 | Appropriate Staffing

The rating for this standard was among the lowest scored. Nevertheless, a significant proportion of respondents expressed strong agreement with the assertion that effective staffing aligns patient needs with the competencies of the nursing workforce (Ulrich et al. 2022; Antoszewska and Gutysz-Wojnicka 2024). This finding suggests that, even under conditions of considerable pressure, the majority of staff members perceive that endeavours were made to align staffing levels with the requisite competencies to meet patient care requirements (Wynendaele et al. 2019). This is a commendable achievement, particularly in light of the unprecedented circumstances. Conversely, it is imperative to exercise caution when interpreting results at the national level and to undertake a more profound investigation into ICU staffing models.

Adequate staffing is one element of HWE that has received more attention, despite the focus being on nurse-to-patient ratios. The available evidence indicates that patient outcomes are more favorable in hospitals with better nurse-to-patient ratios (Wynendaele et al. 2019). Nevertheless, in the context of critically ill patients, it is of paramount importance that staffing decisions take into consideration not only the numerical ratio between nurses and patients, but also the variability in patient needs, patient acuity, nurse competencies, and the status of the work environment (Ulrich et al. 2022; Wynendaele et al. 2019). It is possible to achieve this objective by employing a range of theoretical models, including the AACN Synergy Model for Patient Care (Curley 2007), which has demonstrated encouraging results in terms of achieving favorable patient- and nurse-related outcomes (Nania et al. 2021). It is recommended

that future studies on staffing models in Europe consider the use of comprehensive staffing models as a potential intervention for improving the staffing situation widespread (Greenley et al. 2024; de Vries et al. 2023).

6.5 | Meaningful Recognition

The majority of subjects participating in the present study reported a lack of recognition. Ratings at the organisational level were even lower, suggesting that recognition outside the ICU is a more significant problem. This perception is supported by one of the lowest mean scores observed among the HWE standards, particularly at the organisational level, as shown in Table 3. Previous research has demonstrated that meaningful recognition contributes to an individual's self-awareness of the impact made, the choice of nursing as a profession, and the building of a sense of pride regarding their work (Kester et al. 2021; Avey et al. 2011).

In the study by Ulrich et al. (2019), participating nurses ranked acknowledgement from patients as the most meaningful form of recognition, followed by recognition from fellow RNs. Assuming that nurse managers represent the organisation at the unit level, it might be worthwhile to update managers on strategies for expressing recognition to staff members based on respect (Kester et al. 2021; American Association of Critical-Care Nurses 2005; Ulrich et al. 2019).

6.6 | Authentic Leadership

The mean ratings for the three items combined for all countries were higher than the equivalent mean ratings in the American sample in 2021 (Ulrich et al. 2022). This finding suggests that European nurses hold a more favourable opinion of their nurse leaders and the efforts they make to maintain and support a healthy work environment than their American counterparts (Aiken et al. 2026). This is a highly encouraging indication, particularly given that these ratings were expressed during the pandemic when it was almost impossible to maintain healthy work environments.

Moreover, the significance of leadership in upholding HWE standards, with the potential to mitigate ICU nurses' burnout, was emphasised in a qualitative study conducted in Croatia in 2017 (Friganović et al. 2020). This study coincided with a preceding study in Magnet hospitals (Kramer et al. 2007), which delineated the following characteristics for clinical leaders: “is approachable and safe, cares, walks the talk, motivates development of self-confidence, gives genuine feedback, provides adequate and competent staffing, watches our back, promotes group cohesion and teamwork, and resolves conflicts constructively”.

6.7 | Strengths and Limitations

A significant strength of this study is the considerable sample size, which encompasses 1183 ICU nurses from five different countries. The participants' extensive clinical experience in the ICU is a notable asset, thereby enhancing the credibility of their assessments. The utilisation of the CEHWES developed by the AACN is also advantageous, as it facilitates direct international comparisons and can function as a baseline assessment for future European studies.

However, it should be noted that there are several limitations to this approach. First, we could not assess the representativeness of the sample, as the sample size denominator was unavailable. Second, the utilisation of a convenience sample engenders the potential for social desirability bias, thereby precluding the possibility of extrapolating the findings to the broader population of ICU nurses. Third, no selection criteria regarding a minimum duration of ICU employment were specified, which could have affected the results. However, only 3.6% of the sample had been employed in the ICU for less than a year, and 11.4% for less than two years, minimising the potential impact on the findings. Fourth, this study was observational; therefore, the observed associations between variables do not necessarily imply causality. Fifth, the online survey format may have deterred nurses from participating due to limitations in internet accessibility or unfamiliarity with the online survey platform. Sixth, the study was conducted during the COVID-19 pandemic, which is likely to have influenced responses due to its impact on work environments. However, recent post-pandemics reports still align with our results or are even more concerning (Haegdorens et al. 2026). In addition, international agencies have issued increasing warnings in this area (Greenley et al. 2024). Finally, the loss of data was attributable to the absence of responses, which is presumably ascribed to the survey's duration and the associated burden on the respondents. The aggregation of demographic questions at the conclusion of the survey may have resulted in missing values; consequently, the reliability of the results of the analysis between respondents with incomplete and complete data is uncertain.

6.8 | Implications and Recommendations for Future Research

It is imperative to acknowledge that HWE encompasses ‘soft skills’ such as effective communication and meaningful recognition, given that we are operating within a technocratic healthcare environment that predominantly values outcomes pertaining to enhanced mortality and other financial ‘hard’ metrics (American Association of Critical-Care Nurses 2005). The establishment of an organisational culture that fosters effective communication among team members, acknowledges their contributions, and facilitates the collaborative decision-making process by committed partners is undoubtedly a challenging undertaking (Georgiou et al. 2023; Reeves et al. 2017; Xyrichis et al. 2025).

The results of this study serve as a starting point in the countries studied for identifying areas that require attention in the critical care work environment. It is recommended that national and European professional organisations emulate the example of the AACN by encouraging nurses to assess their units according to HWE standards on a regular basis (Aiken et al. 2026). Furthermore, policymakers and healthcare administrators could promote the assessment in order to identify areas for improvement and depict changes in the standards (Greenley

et al. 2024; Aiken et al. 2026). The implementation of these measures would facilitate the routine collection of data, thereby enabling the identification of successful interventions that could lead to the enhancement of the ICU work environment.

Moreover, this raises several issues relevant to nursing education. It is recommended that both undergraduate and postgraduate programmes are enriched by exposing students to the importance of HWE and its relation to health outcomes (Greenley et al. 2024; Aiken et al. 2026). Furthermore, the curriculum should include training about the soft skills required to attain HWE. This will better equip future nurses to appreciate and advocate for HWE (American Association of Critical-Care Nurses 2005; Georgiou et al. 2023; Aiken et al. 2026).

7 | Conclusion

The participating ICU nurses from the five European countries rated their work environment as moderate. This raises concerns for the quality of the healthcare provided and patient outcomes. The first step towards creating a HWE is to evaluate the current situation. This study's findings support this first step. Following, an appreciation of the direct and indirect ways that these aspects of care do affect patient outcomes as well as the retention of healthcare professionals is required by healthcare professionals, leaders, and patients. Eventually, efforts to improve HWE will need to be embedded within the function of any critical care setting.

Author Contributions

Evanthia Georgiou: conceptualisation, methodology, project administration, supervision, investigation, writing – original draft preparation, writing – review and editing. **Meropi Mpouzika:** data curation, investigation, writing – review and editing. **Mireia Llaurado-Serra:** visualisation, investigation, data curation, writing – original draft preparation, writing – review and editing. **Adriano Friganović:** conceptualisation, methodology, data curation, writing – original draft. **Adrian Sabou:** data curation, methodology, formal analysis, writing – original draft preparation. **Aleksandra Gutysz-Wojnicka:** conceptualisation, methodology, writing – original draft preparation. **Anca Constantinescu-Dobra:** methodology, formal analysis, writing – original draft preparation. **Cristina Alfonso-Arias:** data curation, writing – original draft preparation. **Estel Curado-Santos:** data curation, writing – original draft preparation. **Jelena Slijepcevic:** data curation, writing – original draft preparation. **Mădălina-Alexandra Coțiu:** conceptualisation, methodology, visualisation, formal analysis. **Beata Penar-Zadarko: Slađana Režić:** visualisation, investigation, data curation. **Beata Dobrowolska:** conceptualisation, methodology, data curation, writing – original draft. **Maria Kyranou:** data curation, investigation, writing – review and editing.

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Ethics Statement

Approval was obtained from the Cyprus National Bioethics Committee with the authorisation code: CNBC 2020.01.145. Cyprus was the lead Scientific Co-Ordinator of this project.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Peer Review

The peer review history for this article is available at https://www.webofscience.com/api/gateway/wos/peer-review/10.1111/jan.70559.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** jan70559-sup-0001-Tables.docx.